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Single Sampling Inspections Plans With Specified Acceptance Probability and Minimum Costs.

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1. Introduction and Summary.

To design an economical sampling plan it is necessary to know the costs of sampling inspection, the costs of wrong decisions, and the quality distribution of lots submitted for inspection, the prior distribution. Sometimes it is impossible to specify the prior distribution in detail but a vague knowledge is available which means that not enough is known/ for the minimax solution to be satisfactory. The problem then is to choose a third principle leading to a reasonable solution.

The principle used in the present paper is to specify the acceptance probability for one quality level and minimize the costs for another quality level.

Characterizing the quality of a lot by its fraction defective, p, we denote the costs of acceptance per item in the lot by $k_a(p)$ and the costs of rejection by $k_r(p)$. The value of p for which $k_a(p) = k_r(p)$ is called the break-even or indifference quality, p_o, and it is assumed that $k_a(p) < k_r(p)$ for $p < p_o$ and $k_a(p) > k_r(p)$ for $p > p_o$. Lots of quality $p < p_o$ are called good lots and ought to be accepted, and lots of quality $p > p_o$ are called bad lots and ought to be rejected.

Denoting the costs of sampling per item in the sample by $k_s(p)$, the lot size by N and the sample size by n, the costs of a sampling plan for lots of quality p become

$$K(p) = nk_s(p) + (N-n)\ (k_a(p)P(p) + k_r(p)Q(p)) \tag{1}$$

where $P(p)$ denotes the probability of acceptance and $P(p) + Q(p) = 1$.

From an economic point of view inspection is justified only if the prior distribution extends on both sides of p_o. Let us suppose that our knowledge of the prior distribution is such that we can choose two numbers, p_1 and p_2, $p_1 < p_o < p_2$, so that p_1 is a typical good quality, for instance approximately equal to the average quality of good lots, and p_2 is a typical bad quality.

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/ to find the Bayes solution and on the other hand too much is known

Sampling plans may then be determined according to the principle stated above in various ways. The following two proposals seem to correspond to requirements often met in practice:

(1) Determine (n,c) such that $K(p_1)$ is minimized under the restriction that $P(p_2) = P_2$, where $P_2 < 1/2$ is a specified acceptance probability.

(2) Determine (n,c) such that $K(p_2)$ is minimized under the restriction that $P(p_1) = P_1$, where $P_1 > 1/2$ is a specified acceptance probability.

Using the terminology of a producer and a consumer setting up the sampling plan the two cases may be characterized as (1) fixed consumers risk and minimum producers costs, and (2) fixed producers risk and minimum consumers costs.

In the two cases discussed above the cost functions are assumed known in one point only, p_1 or p_2, different from the break-even point, p_o, which need not be known precisely. If, however, the break-even quality is known we have a third case of special interest since it seems reasonable to require that $P(p_o) = 1/2$ and then minimize $K(p_1)$, $p_1 < p_o$, or $K(p_2)$, $p_2 > p_o$, whichever is supposed to be the most important.

From a mathematical point of view the three proposals are equivalent and a common solution to the problem of determining (n,c) is given in section 3. Furthermore an asymptotic solution has been developed in section 4 and the asymptotic formulas have been slightly modified to give a satisfactory approximation to the exact solution also for quite small lot sizes.

The main properties of the sampling plans <u>for large N</u> are the following:

(1) Sample size increases linearly with the logarithm of lot size.

(2) The highest allowable fraction defective, c/n, in the sample converges to the quality with fixed acceptance probability, the difference being of order $1/\sqrt{n}$.

(3) The risk of the producer or the consumer, whichever has not been fixed, tends to zero inversely proportional to lot size.

(4) In important special cases the minimum costs equal sampling inspection costs plus a constant independent of lot size.

(5) The optimum sampling plans depend on only one cost parameter, γ, see formulas (4) and (7), and the optimum plan for lot size N and cost constant γ equals the plan for lot size $N\gamma$ and cost constant 1.

Three systems of plans have been tabulated:

(1) LTPD plans with minimum producers costs for $\gamma = 1$ and 5. The consumers risk has traditionally been chosen as 10 %. For $\gamma = 1$ we get the Dodge-Romig LTPD plans.

(2) AQL plans with minimum consumers cost for $\gamma = 2$ and 10. The producers risk has been chosen as 5 %.

(3) IQL plans with minimum producers costs for $\gamma = 1$. The probability of acceptance for lots of indifference quality is 50 %.

In all three cases plans have been tabulated both on basis of the hypergeometric and the Poisson distribution.

The system of sampling plans presented here may be considered as a generalization of the Dodge-Romig LTPD plans [1], their average amount of inspection having been replaced by a more general cost function. The IQL plans have previously been considered by Weibull [2] and tabulated by Markbäck [3].

2. Discussion of the model.

The two proposed rules will be called case 1 and 2, respectively.

For case 1 we find from (1)

$$K(p_1) = n(k_s - k_a) + (N-n)\ (k_r - k_a)\ Q(p_1) + Nk_a \tag{2}$$

where the argument p_1 has been left out in the cost functions. If $k_s \leq k_a$ the minimum is obtained for $n = N$. For $k_s > k_a$ we have

$$K(p_1)/(k_s(p_1)-k_a(p_1)) = n + (N-n)\ \gamma_1 Q(p_1) + N\delta_1 \tag{3}$$

where

$$\gamma_1 = \frac{k_r(p_1)-k_a(p_1)}{k_s(p_1)-k_a(p_1)} > 0 \quad \text{and} \quad \delta_1 = \frac{k_a(p_1)}{k_s(p_1)-k_a(p_1)} > 0. \tag{4}$$

Minimizing the first two terms on the right hand side of (3) with respect to (n,c) will thus lead to the same values of (n,c) as minimizing (2). <u>The optimum sampling plan therefore depends on only one cost parameter</u> γ_1 which is determined as <u>the ratio between the two losses</u> $k_r(p_1) - k_a(p_1)$ and $k_s(p_1) - k_a(p_1)$.

For case 2 we find similarly

$$K(p_2) = n(k_s - k_r) + (N - n)(k_a - k_r)P(p_2) + Nk_r \tag{5}$$

and for $k_s > k_r$

$$K(p_2)/(k_s(p_2)-k_r(p_2)) = n + (N - n)\gamma_2 P(p_2) + N\delta_2 \tag{6}$$

where

$$\gamma_2 = \frac{k_a(p_2)-k_r(p_2)}{k_s(p_2)-k_r(p_2)} > 0 \quad \text{and} \quad \delta_2 = \frac{k_r(p_2)}{k_s(p_2)-k_r(p_2)} > 0. \tag{7}$$

If the prior distribution was known the costs of the Bayes solution could be compared to the average costs of acceptance without inspection/ to find out whether sampling should be carried out at all. Since such comparisons cannot be made when the prior distribution in unknown we shall always determine a sampling plan. It may, however, turn out that we are led to total inspection ($n = N$) instead of sampling inspection.

To find a sampling plan we must have $K(p) < Nk_s(p)$ for the value of p for which $K(p)$ is minimized. This leads to the condition

$$Nk_s(p) - K(p) = (N-n)\ \{(k_s-k_a)P(p) + (k_s-k_r)Q(p)\} > 0.$$

Solving this inequality we get as condition for $n < N$ that

$$Q(p_1) < \frac{1}{\gamma_1}, \quad \text{(case 1)}, \tag{8}$$

and

$$P(p_2) < \frac{1}{\gamma_2}, \quad \text{(case 2)}. \tag{9}$$

To solve the problem formulated in the present paper we need only know the relative losses at one quality level, see (3) and (6), so that much less knowledge is required regarding costs than originally implied by the cost function (1). It may, however, be of interest to point out that the cost structure used here is similar to the ones used by for example Dodge and Romig [1], Guthrie and Johns [4] and Hald [5]. A simple and in practice useful specification is obtained by setting $k_a(p) = a_1 + a_2p$, $k_r(p) = r_1 + r_2p$, and $k_s(p) = s_1 + s_2p$ which means that a_1 is equal to costs of accepting an item without regard to quality, a_2 equals additional costs for an accepted defective item, and the other constants have similar interpretations. For many practical purposes we may even have the simpler specification: $k_a(p) = ap$, $k_r(p) = r$, and $k_s(p) = s$.

For linear cost functions and a binomially distributed fraction defective we have that $E(K(p)) = K(\bar{p})$, the hypergeometric probabilities in $K(p)$ being transformed to binomial probabilities in $K(\bar{p})$ and p replaced by $\bar{p} = E(p)$.

It is difficult to state general rules for the relation between $k_s(p)$ and $k_r(p)$ but some typical cases may be pointed out.

In case of rectifying inspection rejection means inspection of the remainder of the lot. In such cases we often have $k_r(p) = k_s(p)$ but we may also have $k_r(p) < k_s(p)$. This may happen if inspection of the remainder is made by other methods than used for sampling inspection. If sampling inspection is carried out with respect to many quality characteristics and the inspection result discloses that only one characteristic is responsible for rejection of a lot then the remainder need only be inspected for this one characteristic.

/and of rejection without inspection

For destructive testing we have $k_s(p) > k_r(p)$ because sampling and testing costs are being added to the value of the item. In such cases rejection may mean scrapping, downgrading or performing some salvage operation on the remainder. In case a cheap salvage operation is possible $k_r(p)$ will usually be quite small as compared to $k_s(p)$ whereas in case of scrapping $k_r(p)$ will often be of the same size as $k_s(p)$.

For non-rectifying inspection with non-destructive testing rejection may similarly mean scrapping, downgrading or salvaging. In such cases $k_s(p)$ may be considerably larger or smaller than $k_r(p)$.

Two special cases of the model are of particular interest.

Consider first the case where a producer inspects his own product before delivery. To be reasonably sure that bad lots are rejected he specifies a low acceptance probability, $P(p_2) = 0.10$ say, and minimizes costs for lots of quality p_1. Very often he will know only costs of sampling and rejection and therefore be content with minimization of

$$K(p_1) = nk_s(p_1) + (N-n)k_r(p_1)Q(p_1) \tag{10}$$

which is found from (2) for $k_a(p_1) = 0$. If the producer knows that p_1 corresponds to good market quality so the consumer is supposed to accept this quality without complaints then he is justified in setting $k_a(p_1) = 0$ and using the simple model above. For $\gamma_1 = k_r(p_1)/k_s(p_1) = 1$ we get the Dodge-Romig LTPD system of sampling plans.

Consider next the case where a consumer inspects submitted lots. To be reasonably sure that good lots are accepted he specifies a high acceptance probability, $P(p_1) = 0.95$ say, and minimizes costs for lots of quality p_2. Very often his costs consist of sampling and acceptance costs only so that he will be content with minimization of

$$K(p_2) = nk_s(p_2) + (N-n)k_a(p_2)P(p_2) \tag{11}$$

which is found from (5) for $k_r(p_2) = 0$. If it is agreed that p_2 represents unsatisfactory quality so that the consumer may return (or repair) lots of this quality at the producers expense then the consumer is justified in setting $k_r(p_2) = 0$ and using the simple model above.

To indicate the relation between the solution proposed here and the Bayes solution we introduce the prior distribution $\varphi(p)$ and

$$\begin{aligned}\bar{K} &= \int_0^1 K(p)\varphi(p)dp \\ &= K(p_1')\int_0^{p_o} \varphi(p)dp + K(p_2')\int_{p_o}^1 \varphi(p)dp \end{aligned} \tag{12}$$

where $0 < p_1' < p_o < p_2' < 1$, p_1' and p_2' being determined by the mean value theorem. Instead of choosing the sampling plan minimizing $\bar{K}$, the Bayes solution, we have proposed to minimize one of the components of $\bar{K}$ (if our p chosen equals p') and tried to reduce the other by a suitable requirement to the acceptance probability.

For the Bayes solution we know that $P(p_o) \longrightarrow 1/2$ with increasing lot size. If the prior distribution is not completely known and if both $k_a(p)$ and $k_r(p)$ differ from zero it seems therefore reasonable to require that $P(p_o) = 1/2$ and to minimize either $K(p_1)$ or $K(p_2)$ depending on which term of (12) is considered most important. A comparison of the Bayes solution and the one presented here has been given by Hald [6].

As the third important special case we therefore consider minimization of (3) or (6) under the condition $P(p_o) = 1/2$. This may be of particular interest in cases where one department delivers goods to another within the same firm. The costs of the receiving department are expressed by means of $k_a(p)$, the costs of the delivering department by $k_r(p)$, and the costs of the inspection department by $k_s(p)$.

In the above discussions costs have been expressed as functions of p. It had been more correct, however, to regard costs as functions of p and x, the number of defectives in the sample, but since $x = np + O(\sqrt{n})$ the formulation used may be considered as an approximation sufficiently good for practical purposes in view of the considerable uncertainty often connected with the choice of the parameters in the model.

3. The exact solution.

Since the three cases are of the same mathematical structure a common solution will be given.

Let $\hat{p}$ (equal to p_1 or p_2) denote the quality for which costs should be minimized and let p^* (equal to p_o, p_1, or p_2) denote the quality for which the acceptance probability has been specified. The problem then consists in finding (n,c) so that $K(\hat{p})$ is minimized and at the same time $P(p^*) = P^*$, P^* being a given number. This problem is similar to Dodge and Romigs problem for the LTPD plans and it will be solved here along similar lines as in Hald [7].

Setting $M = Np^*$ we have

$$P_H(p^*) = H(c,n,p^*,N) = \sum_{x=o}^{c} \binom{M}{x}\binom{N-M}{n-x} \Big/ \binom{N}{n} = \varphi^* \qquad (13)$$

which for given N defines a relation between n and c. The solution of (13) with respect to n or $m = np^*$ for given p^* and P^* will be denoted by $m = m_{c,M}$.

Multiplying (1) by p^* we find

$$z = p^*K(\hat{p}) = mk_s(\hat{p}) + (M-m)(k_a(\hat{p})P(\hat{p}) + k_r(\hat{p})Q(\hat{p})) \qquad (14)$$

which is the function to be minimized subject to condition (13). The probability of acceptance is here defined as

$$P(\hat{p}) = B(c,n,\hat{p}) = \sum_{x=o}^{c} \binom{n}{x}\hat{p}^x \hat{q}^{n-x}. \qquad (15)$$

In the following we shall suppress the argument p in (14) and write

$$z = m(k_s-k_r) + (M-m)(k_a-k_r)P + Mk_r. \tag{16}$$

For a given M the solution $m = m_{c,M}$ of (13) is inserted into (16) which makes z a function of c alone, z(c) say. The condition for z(c) to be a local minimum is that

$$\Delta z(c-1) < 0 < \Delta z(c) \tag{1 }$$

where $\Delta z(c) = z(c+1) - z(c)$. From (16) we find

$$\begin{aligned}\Delta z &= (k_s-k_r)\Delta m_{c,M} + M(k_a-k_r)\Delta P_{c,M} - (k_a-k_r)\ \Delta(m_{c,M}\ P_{c,M}) \\ &= (k_r-k_a)\ \left[-M\Delta P_{c,M} + \ \lambda\Delta m_{c,M} + \Delta(m_{c,M}\ P_{c,M})\right]\end{aligned} \tag{18}$$

where

$$\lambda = (k_s(\hat{f}) - k_r(\hat{p}))\ /\ (k_r(\hat{p}) - k_a(\hat{p})) \tag{19}$$

and $P = B(c,m/p^*,p)$ like m is a function of c.

Introducing the auxiliary function

$$F(c,M) = \frac{\lambda\Delta m_{c,M} + \Delta(m_{c,M}P_{c,M})}{\Delta P_{c,M}} = m_{c+1,M} + (\lambda + P_{c,M})\ \frac{\Delta m_{c,M}}{\Delta P_{c,M}}\ , \tag{20}$$

substituting (18) into (17) and "solving" for M lead to the fundamental inequality

$$F(c-1,M) < M < F(c,M) \tag{21}$$

together with

$$(k_r-k_a)\Delta P_{c-1,M} > 0 \text{ and } (k_r-k_a)\ \Delta P_{c,M} > 0 \tag{22}$$

as the conditions for c and $n = m_{c,M}/p^*$ to be the optimum plan for lot size $N = M/p^*$.

It has only been proved that (21) and (22) are the conditions for z(c) to be a local minimum. A similar analysis may, however, be carried out by means of the difference operator $\Delta_i z(c) = z(c+i) - z(c)$. The condition for z(c) to be an absolute minimum is that $\Delta_i z(c) > 0$ for $i = 1,2,\ldots,n-c$, and $\Delta_i(c-i) < 0$ for $i = 1,2,\ldots,c$. It is easily seen that sufficient conditions for these inequalities to be fulfilled are that z(c) be a local minimum, i.e. (21) is fulfilled, and furthermore that F(c,M) be a non-decreasing function of c, since the inequalities

$$M \quad F(c,M) \leq F(c+1,M) \quad \ldots \quad F(c+i-1,M)$$

by addition of all the numerators and denominators lead to

$$M \leq F(c,M) \qquad \frac{\lambda\Delta_i m_{c,M} + \Delta_i(m_{c,M}P_{c,M})}{\Delta_i P_{c,M}}\ . \tag{23}$$

(I have not succeeded in finding general conditions for $F(c,M)$ to be a non-decreasing function of c. In all cases investigated it has been found that the local minimum defined by (21) and (22) is also the absolute minimum).

The solution obtained may be used in two ways: (1) To find (n,c) for a given N, and (2) to find (n,N) for a given c. Since the solution is given as an implicit function of N it is not as well suited for the first purpose as for the second.

To find an optimum plan (n,c) for a given lot size N we first guess at a value of c, which then is used to compute $m_{c,M}$ from (13), $P_{c,M}$ from (15), and $F(c,M)$ from (20). If $M = Np^*$ satisfies (21), the value of c chosen is the optimum one, otherwise a new value has to be tried. This procedure is very tedious, and it is therefore important to develop approximations giving c and n as explicit functions of N as done in section 4.

The solution is much better suited to a systematic tabulation of optimum sampling plans with c as argument. The inequality (21) shows that for each c there exists an "optimum interval" for M and within that interval a relation between m and M is given by (13). The same idea has been given by Dodge and Romig [1] in their graphical presentation of the LTPD sampling inspection plans.

The upper limit of the interval for M having c as optimum acceptance number is determined as solution to the equation $M = F(c,M)$. The solution is obtained by iteration starting from c and $m_{c,\infty}$ which is found from the equation

$$B(c,m) = \sum_{x=o}^{c} e^{-m} \frac{m^x}{x!} = P^* \tag{24}$$

since the Poisson distribution may be used as approximation to the hypergeometric distribution for large M and small p^*. This leads to

$$m_{c,\infty} = \frac{1}{2} \chi^2_{1-P^*} (2c + 2), \tag{25}$$

i.e. half the $1 - P^*$ fractile of the χ^2 distribution with $2c + 2$ degrees of freedom, so that $m_{c,\infty}$ may be obtained from existing tables.

From $(c, m_{c,\infty})$ we compute

$$M^1 = F(c,\infty)$$

by means of (20), $m^1 = m_{c,M^1}$ from (13), $M^2 = F(c,M^1)$, and so on. This procedure has been coded for an electronic computer and the attached tables have been constructed in that way. As stopping rule for the iteration has been used the criterion

$$|M^{i+1} - M^i| < 0.0005 \min \{M^i, M^{i+1}\} .$$

The solution has then been given as $M = M^{i+1}$ and $m = m_{c,M}$.

Since the hypergeometric distribution in (13) is difficult to handle an approximation developed by Wise [8] has been used in the computations. This is based on the binomial approximation

$$B(c,M,\frac{m_o}{M}) = \sum_{x=o}^{c} \binom{M}{x}\left(\frac{m_o}{M}\right)^x \left(1 - \frac{m_o}{M}\right)^{M-x} = P^* \tag{26}$$

to (13). The unknown m_o is found by iteration according to Newtons method. From m_o an approximation to $m = m_{c,M}$ is found by means of Wises formula

$$m = m_o \frac{Q}{N} + \frac{cM}{2N} - \frac{M}{24QN} \tag{27}$$

where

$$Q = N - (M - 1)/2,$$

$$\delta = (\frac{1}{1-h} - 1 + h)(M-c)^2 + (h - \frac{1}{h})(c + 1)^2 - (1-2h)\left[(M-c-1)c-1\right] + \frac{1}{h} - \frac{1}{1-h}$$

and $h = m_o/M$.

For each plan tabulated the condition (13) has been checked by means of Wises approximation

$$H(c,n,p^*,N) \cong B(c,M,h) + \binom{M}{c}h^c(1-h)^{M-c} \frac{(M-c)h\,\varepsilon}{24(1-h)^2(n - \frac{c}{2})^2} \tag{28}$$

where

$$\varepsilon = (M-c-1)ch(1-h)(1-2h)-h^2(2-h) \left[(M-c)^2-1\right] +c(c+2)(1-h)^2(1+h)$$

and

$$h = (n - \frac{c}{2}) \Big/ (\frac{M}{p^*} - \frac{M-1}{2}).$$

The two approximations work satisfactory even for quite small N. By using them, however, p^*, the fraction defective of the lot, is treated as continuous whereas it ought to take on only the values X/N for X = 0,1,...,N. The effect of this is negligible apart from cases with small values of p^* and N where the approximations may lead to a sample size nearly equal to lot size in stead of total inspection. In extreme cases this has been corrected, but it has not been attempted in general to work out the exact solution from the hypergeometric distribution for small N because its value seems very limited from the point of view of applications of the tables.

For large N the Poisson distribution may be used as approximation to both the hypergeometric and the binomial distribution in (13) and (15) respectively. Also the original problem may be such that the Poisson distribution is the appropriate one to use, i.e. if quality is measured in defects per unit in stead of in fraction defective. For these reasons the "Poisson solution" has also been tabulated. Since $m_{c,M}$ in this case is a function of c only, see (25), we get

$$M = \frac{\lambda\Delta m_c + \Delta(m_c P_c)}{\Delta P_c}, \tag{29}$$

where

$$P_c = \sum_{x=o}^{c} e^{-rm} \frac{(rm)^x}{x!} , \qquad r = \frac{\hat{p}}{p^*} , \tag{30}$$

which means that M, the upper end-point of the interval in which c is the optimum acceptance number, is determined explicitly as a function of c. It is therefore possible to give a much more compact tabulation of the Poisson solution than of the hypergeometric one.

In the following sections it will be discussed how to use the Poisson solution to obtain approximations to the hypergeometric or the binomial solution.

As discussed in section 2 it may happen that total inspection is cheaper than sampling inspection for lots of quality $\hat{p}$ when $\;\; > 1$, see (8) and (9). In such cases the cheapest sampling plan has nevertheless been tabulated but the sample size has been underlined to indicate that total inspection is the cheaper solution.

A few remarks might be appropriate here regarding the definition of the acceptance probabilities for $p = \hat{p}$ and $p = p^*$, respectively. For quality p^* the specified acceptance probability P^* has been defined by means of the hypergeometric distribution, see (13), which means that this probability refers to a series of lots all of exactly the same quality p^*. For quality $\hat{p}$ the acceptance probability $P(\hat{p})$ has been defined by means of the binomial distribution, see (15), which means that this probability is the average probability of acceptance for a series of lots of varying quality, the lots being produced by a binomially controlled process with $\hat{p}$ as true fraction defective. This distinction is the one introduced by Dodge and Romig [1] as the Type A and B probabilities of acceptance.

Other combinations of binomial and hypergeometric probabilities are obviously possible and these might be supported by reasonable but not more convincing arguments. We have therefore kept to the definitions used by Dodge and Romig. For $n/N < 0.10$ the distinction is of no practical importance.

4. The approximate solution.

The procedure in arriving to an approximate solution giving c and n as explicit functions of N will be first to solve the problem for $N \longrightarrow \infty$, treating all variables as continuous, and then to correct the asymptotic solution to obtain better approximations for small lot sizes. Similar results have previously been obtained by Hald [7] for the Dodge-Romig LTPD sampling plans.

The asymptotic relation between c and $m = np^*$ is obtained by solving the equation $B(c,m) = P^*$ which has the solution

$$m = c + 1 + u\sqrt{c+1} + (u^2 - 1)/3 + O(1/\sqrt{c}) \tag{31}$$

or

$$c = m - u\sqrt{m} + (u^2 - 4)/6 + O(1/\sqrt{m}) \tag{32}$$

where $u = u_{Q*}$ denotes the $Q* = 1 - P*$ fractile of the standardized normal distribution. This result follows immediately from the Fisher-Cornish expansion of the χ^2 fractiles and the relation $2m = \chi^2_{Q*}(2c+2)$.

As shown by Hald [7] the Poisson solution may be adjusted to give an approximate solution to the corresponding binomial equation $B(c,M,m_b/M) = P*$

$$m_b = m(1 - \frac{m-c}{2M}) \tag{33}$$

which in turn may be used to find the required solution to (13)

$$m_h = (m - \frac{m-c}{2} p*)(1 - \frac{m-c}{2M}(1 - \frac{p*}{2})). \tag{34}$$

For any given c we may thus by means of the Poisson solution m obtain an approximate solution to the corresponding hypergeometric equation (13).

To find m as a function of M we rewrite (16) on the two forms

$$z = (k_r - k_a)(1+\lambda)\{ m + \gamma_1(M-m)Q + M\delta_1 \}, \quad \hat{p} < p*, \tag{35}$$

and

$$z = (k_r - k_a)\lambda\{ m + \gamma_2(M-m)P + M\delta_2 \}, \quad \hat{p} > p*, \tag{36}$$

$\gamma_1, \gamma_2, \delta_1$, and δ_2 being defined as in (4) and (7), introduce asymptotic expansions for Q and P in terms of m for $m \to \infty$ and solve the equation $dz/dm = 0$.

The first step is to find an asymptotic expansion of $P = B(c,n,\hat{p})$ for $m = np* \to \infty$ which means that also $c \to \infty$ according to (32). Introducing $r = \hat{p}/p*$, approximating the binomial by the Poisson distribution $P = B(c,n\hat{p}) = B(c,rm)$, and using the asymptotic expansion developed by Blackwell and Hodges [9] we find for $r < 1$

$$Q = 1 - B(c,rm) = \frac{rm}{c-rm} \frac{1}{\sqrt{2\pi c}} \exp\{-rm + c - c \log \frac{c}{rm}\}(1+O((c-rm)^{-1})) \tag{37}$$

For $r > 1$ we find a similar expansion for P the only difference being that c-rm has to be replaced by rm-c. Both Q for $r < 1$ and P for $r > 1$ are "tail probabilities" of the same kind describing the producers risk at quality level $rp*$ $(r < 1)$ for fixed consumers risk at level $p*$, and the consumers risk at level $rp*$ $(r > 1)$ for fixed producers risk at level $p*$.

The two forms of z may therefore be considered as linear functions of y, say,

$$y = m + \gamma(M-m)f(m), \tag{38}$$

f(m) being defined by (37) with c-rm replaced by $|c-rm|$, and the equation $dz/dm = 0$ consequently has the same solution as $dy/dm = 0$. Solving the equation

$$dy/dm = 1+\gamma(M-m)f'(m) - \gamma f(m) = 0$$

we find

$$M - m = -\frac{1-\gamma f(m)}{\gamma f'(m)} = \frac{1}{\gamma f(m)} \frac{1-\gamma f(m)}{(-f'(m)/f(m))}$$

or

$$\log(M-m) = -\log f(m) - \log(-d\log f(m)/dm) + \log(1-\gamma f(m)) - \log\gamma. \qquad (39)$$

This relation gives us M as a function of m and it is of exactly the same form as the one derived for the Dodge-Romig LTPD plans by Hald [7]. It follows that the asymptotic expansion is

$$\log(M-m) = \alpha_1 m + \alpha_2\sqrt{m} + \frac{1}{2}\log m + \alpha_3 - \log\gamma + O(m^{-\frac{1}{2}}) \qquad (40)$$

where

$$\alpha_1 = r - \log r - 1, \qquad \alpha_2 = u\log r,$$

$$\alpha_3 = \frac{1}{2}u^2 - \frac{1}{6}(u^2-4)\log r - \log\frac{r(r-\log r-1)}{|1-r|\sqrt{2\pi}},$$

and $u = u_{Q*}$, the $Q* = 1 - P*$ fractile of the standardized normal distribution.

Formulas (31), (34), and (40) give good approximations to their exact solution for $M > 15$ if r is outside the interval (0.5, 1.5), $p* \leq 0.10$ and $P* = 0.10$, 0.50 or 0.95. They should be used in the following way: For c = 0.5, 1.5, 2.5, etc. m is computed from (31) and M from (40) to obtain <u>intervals</u> for M corresponding to every integer value of c. For each integer value of c we then compute m from (31) and use (34) to determine the relation between m_h and M within the given M-interval.

Considering M as function of m and γ, $M = M(m,\gamma)$ say, (40) gives the simple and important result that asymptotically

$$M(m,\gamma) = M(m,1)/\gamma, \qquad (41)$$

<u>i.e. the sampling plan for lot size N and cost constant γ equals the plan for lot size $N\gamma$ and cost constant 1.</u>

It is therefore only necessary to tabulate M by (40) for $\gamma = 1$.

Whereas the procedure indicated above is the more simple for a complete tabulation of sampling plans corresponding to all lot sizes we need an inversion of the formulas to be able to compute the plan corresponding to a given lot size. The inversion of formula (31) leads to formula (32). As shown by Hald [7] the inversion of (40) leads to

$$m = \beta_1 x + \beta_2\sqrt{x} + \beta_3\log x + \beta_4 + \beta_5\frac{\log x}{\sqrt{x}} + \beta_6\frac{1}{\sqrt{x}} + O(x^{-\frac{1}{2}}) \qquad (42)$$

where $x = \log M$, $\beta_1 = 1/\alpha_1$, $\beta_2 = -\alpha_2/\alpha_1^{3/2}$, $\beta_3 = -\beta_1/2$, $\beta_4 = (\log \alpha_1 + \alpha_2^2/\alpha_1 - 2\alpha_3 + 2\log\gamma)/2\alpha_1$, $\beta_5 = -\beta_2/4$, and $\beta_6 = \beta_5(2-2\alpha_1\beta_4 + \alpha_2^2/2\alpha_1)$.

From a given $M = Np^*$ we compute m by (42) and c by (32). Choosing the nearest integer value of c we next compute m by (31) and the adjusted m_h by (34) which gives $n = m_h/p^*$.

Numerical investigations have shown that (42) leads to rather accurate results for $P^* = 0.10$, $p^* \leq 0.10$, $r \leq 0.5$ and $M > 15$ whereas it should not be used for $P^* = 0.50$ or $P^* = 0.95$.

Asymptotically the main results are that sample size increases linearly with the logarithm of lot size and that the highest allowable fraction defective in the sample converges to p^*, the difference being of order $1/\sqrt{n}$.

Considering m as a function of M and γ, $m = m(M,\gamma)$ say, (42) shows that asymptotically

$$m(M,\gamma) = m(M,1) + \frac{\log\gamma}{\alpha_1}, \tag{43}$$

i.e. sample size is a linear increasing function of $\log\gamma$ for given lot size.

It follows from the asymptotic expansions that for the optimum plans we have

$$\log f(m) = -\log(M-m) - \log(r - \log r - 1) - \log\gamma + O(m^{-\frac{1}{2}})$$

or

$$f(m) = \frac{1}{(M-m)\gamma(r-\log r - 1)}\,(1 + O(m^{-\frac{1}{2}})) \tag{44}$$

which means that the risk of the producer or the consumer, whichever has not been fixed, asymptotically tends to zero inversely proportional to lot size.

Inserting this result into (38) gives

$$y = m + \frac{1}{r - \log r - 1} + O(m^{-\frac{1}{2}}) \tag{45}$$

which leads to the following asymptotic expressions for the minimum costs

$$z \sim k_s(m + \frac{1}{\alpha_1}) + k_a(M - m - \frac{1}{\alpha_1}), \quad \hat{p} < p^* \tag{46}$$

and

$$z \sim k_s(m + \frac{1}{\alpha_1}) + k_r(M - m - \frac{1}{\alpha_1}), \quad \hat{p} > p^*. \tag{47}$$

In the important special cases with $k_a(\hat{p}) = 0$ and $k_r(\hat{p}) = 0$ it will be seen that the minimum costs asymptotically equal sampling inspection costs, $k_s n$, plus a constant, $k_s/\alpha_1 p^*$, i.e. apart from sampling inspection costs the minimum costs are independent of lot size.

In the following sections some special cases will be discussed.

5. LTPD plans with minimum producers costs.

LTPD plans are here defined by fixing the Lot Tolerance Per Cent Defective, $100p_2$, and the corresponding probability of acceptance, the consumers risk $P(p_2)$, which traditionally is chosen as 10 per cent.

As shown in section 2 the optimum plan may always be obtained by minimizing the cost function written on standardized form

$$K_o(p) = n + \gamma(N-n)Q(p_1). \tag{48}$$

For γ - 1 we get the Dodge-Romig LTPD plans.

The tables show the exact solution computed as described in section 3/‾for five values of $r = p_1/p_2$ chosen among the values r = 0.1, 0.2,..., 0.[illegible] and for γ = 1 and 5, giving a total of 10 x 5 x 2 = 100 tables. In each table the relation between N,n, and c has been given, supplemented by $P(p_1)$ which makes it easy to compute $K(p_1)$. The same 20 values of N between 30 and 200,000 have been used in all the tables. Plans have been computed only for $c \leq 99$.

Originally it was intended to give a complete tabulation in accordance with the theoretical solution in section 3, but these tables proved to take up too much space, see Table 1 for an example. The structure of the solution is, however, clearly displayed in this table which is therefore useful in discussing <u>methods of interpolation</u> in the more compact tables published here. Table 1 shows corresponding end-points of N- and n-intervals for each c = 0,1,2,... with the modification that large n-intervals have been subdivided. N has been determined to three significant figures only.

Table 1

LTPD plans with minimum producers costs. $100p_2 = 1$, $100p_1 = 0.1$, $\gamma = 1$

N	n	c	n_1	N_1	n_h
1 - 59	All	-			-
60 - 125	59 - 105	0			19
126 - 259	1[illegible]5 - 152	0			128
260 - 53[illegible]	153 - 187	0			180
538 - 1110	188 - 207	0	230	1250	205
1110 - 2040	341 - 361	1			360
2040 - 3730	362 - 373	1	389	3770	373
3730 - 11900	508 - 523	2	532	11700	523
11900 - 39000	656 - 663	3	668	38200	663
39000 - 131000	793 - 796	4	799	128000	796

/‾for 100 p_2 = 0.5, 1,2,3,4,5,7,10,15,2o,

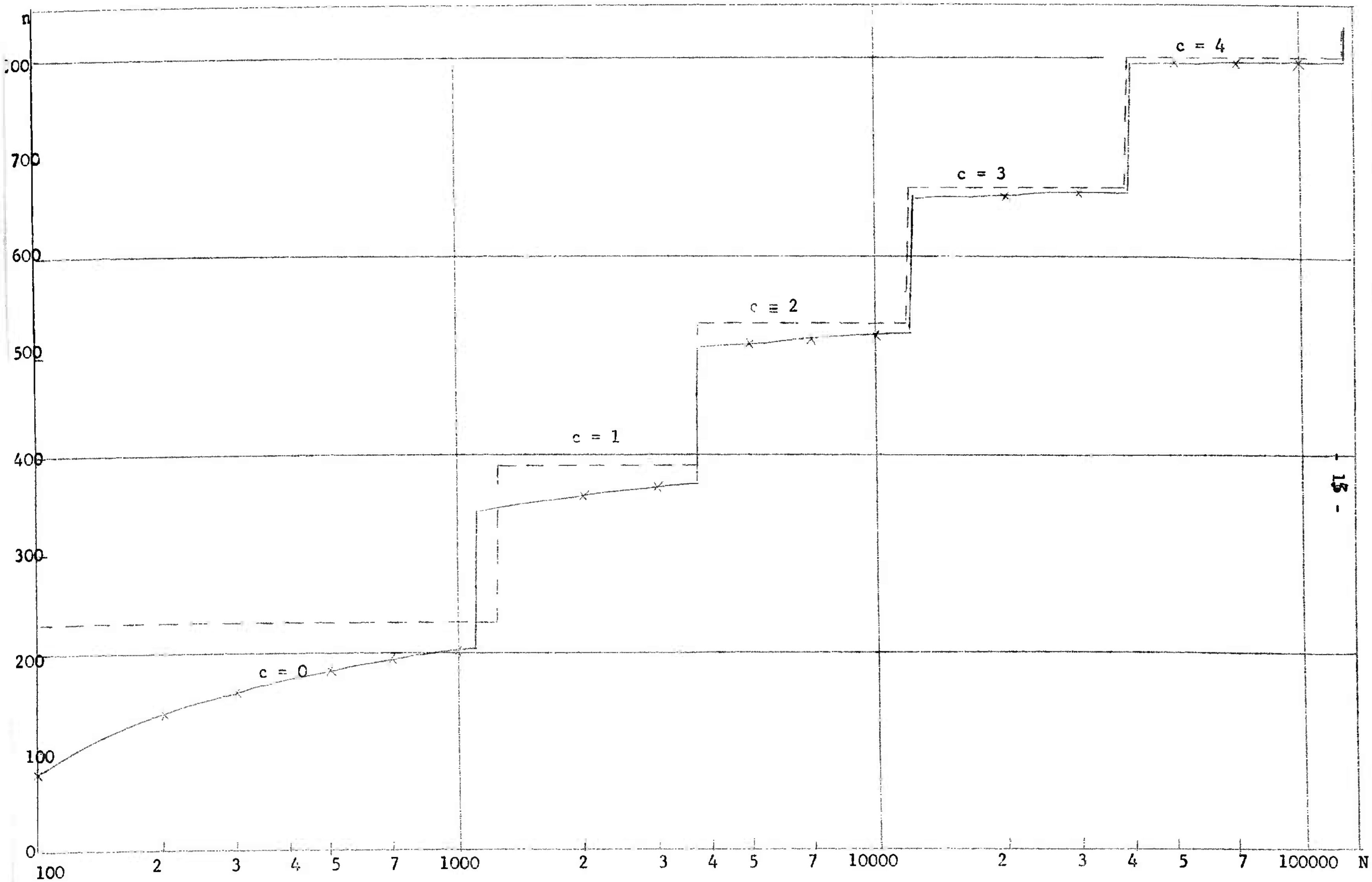

Fig. 1. Relation between lot size and sample size for the LTPD plans in Table 1. Full line Hypergeometric solution. Broken line Poisson solution. Crosses Values from abridged table.

It will be seen that n jumps to a new and higher level each time c increases by 1, the jumps being of approximately the same size. On each level n is an increasing function of N, the slope, however, being a decreasing function of c. This also follows from (34) since m - c for given c is a positive constant which only increases as $\sqrt{c}$ whereas M increases as e^c. This is clearly brought out by Fig. 1.

In view of this picture it is clear that the correct value of c has to be determined before interpolation with respect to n can be carried out.

Looking at Fig. 1 it will be seen that if the given N is between two tabular values of N with the same value of c then n may be determined by linear interpolation.

If the given N is between two tabular values of N with consecutive values of c, then the "nearest" c value is chosen, but n cannot be determined by linear interpolation. We may, however, use (34) to determine an approximate value of n. Denoting the left hand side of (34) for given c by m(M) we have approximately

$$\frac{m(M_1)}{m(M)} = 1 + \frac{m-c}{2}\left(\frac{1}{M} - \frac{1}{M_1}\right)\left(1 - \frac{p_2}{2}\right) \tag{49}$$

from which we may easily find $m(M_1)$.

Suppose that $N_1 = 1500$. Table 1 shows that c = 1 and linear interpolation gives $n_1 = 349$. From the corresponding less detailed table we see that we have to choose between c = 0 and c = 1. Choosing c = 1 the problem is to determine n_1 from N = 2000 and n = 361. Using (49) with c = 1, $m \cong m(M) = 3.61$, M = 20 and $M_1 = 15$ we find

$$n_1 \cong 361(1 - 1.30 \times 0.017) = 353.$$

In the third case the given N is between two tabular values corresponding to c-values differing more than 1. This will ordinarily only happen for large values of c for which n is nearly constant, i.e. independent of N for given c. The value of c is then determined by linear interpolation with respect to N and after rounding to the nearest integer n is determined from the c-value found by linear interpolation with respect to c.

In all cases interpolation ought to be linear in log N in stead of in N, at least for large N, see (40), but it is hardly the worth while to use logarithms, if the purpose is to look up a sampling plan for application in practice.

The proposed method of interpolation will ordinarily give the correct value of c but may lead to a value differing $\pm$ 1 from the correct one. As pointed out above it is essential to use the right method to determine n when c has been found to secure that $P(p_2) = 0.10$. If these rules are followed the plans determined by interpolation will be optimum or nearly so since the minimum of the cost function is rather broad.

The Poisson solution has been given for $c \leq 99$ with the modification that tabulation has been stopped when M exceeds 50.000. Because only an abridged version is published the last figure for M given in a column may be less than 50.000 even if $c < 99$. This means, however, that $M > 50.000$ for the next entry. M has been determined to three significant figures.

Table 1 shows how the Poisson solution may be used to obtain an approximation to the hypergeometric one. The figures for n_1 and N_1 have been found from the Poisson table as $n_1 = m/p_2 = 100$ m and $N_1 = M/p_2 = 100$ M, N_1 giving the upper end-point of the lot size interval for the corresponding c. By means of (34) the Poisson sample size has then been corrected leading to n_k which is a good approximation to the hypergeometric solution apart from the first two values.

It should be observed, however, that the example in Table 1 has been choosen with the purpose to demonstrate the discontinuity of the solution wherefore it is somewhat extreme in various respects. For larger values of p_2 and $r = p_1/p_2$ the discontinuity will be much less pronounced since the height of the steps decreases when p_2 increases and the width decreases when r increases. On the other hand the approximation obtained from the Poisson solution becomes poorer with increasing p_2 and r.

The "point-tabulation" used here may easily be transformed to an "interval-tabulation". in various ways. It is customary in practice to set up intervals for N and use the same sampling plan for all N within an interval. This means, however, that the condition $P(p_2) = 0.10$ can be upheld only for one value of N in each interval. Since $P(p_2)$ for given (n,c) is an increasing function of N two ways of constructing intervals seem reasonable.

(1) The tabular values of N are considered as "midpoints" of the following intervals:

N	Interval
100	85 - 150
200	150 - 250
300	250 - 400
500	400 - 600
700	600 - 850

The result will be that $P(p_2)$ on the average over the interval equals 0.10.

(2) The tabular values of N are considered as endpoints of an interval which means that $P(p_2) \leq 0.10$ for all N. This is one of the principles used by Dodge and Romig [1] in constructing their interval-tables.

It should be noted that the effect of N's variation is small when n/N is small.

The plans have been tabulated for two values of γ only, $\gamma = 1$ and $\gamma = 5$. Plans for other values of γ may be obtained from these tables by using formula (41) in the following way:

For $\gamma < 3$ and a given N compute $N^* = N$ and look up the plan for N^* in the table for $\gamma=1$.

For $3 \leq \gamma \leq 10$ and a given N compute $N^*=N\gamma/5$ and look up the plan for N^* in the table for $\gamma=5$

As shown in section 4 the first rule is exact for $N \rightarrow \infty$ and all values of γ. Numerical investigations have shown that it works remarkably well also for finite N and small values of γ. By means of the two tables and the corresponding rules all values of $\gamma \leq 10$ have thus been accounted for which probably is sufficient for most practical purposes.

Using these rules the largest deviations from the exact solution must be expected to occur for values of γ around 3. It should also be noted that the deviations increases with $r = p_1/p_2$. The table for $\gamma = 1$ gives the right or too large an acceptance number when used for $\gamma > 1$ and the right or too low an acceptance number when used for $\gamma < 1$. Similar results are valid for $\gamma = 5$.

To demonstrate how the formulas work in the worst case with respect to γ plans for $\gamma = 3$ have been derived both from $\gamma = 1$ and $\gamma = 5$ in Table 2. It will bee seen that the values of c found in most cases deviate at most by 1 which means that one of the plans found in the optimum one and the other one is nearly optimum.

As an example suppose that lots of 1000 items each are submitted for inspection and that the LTPD is 5 % and average good quality is 1 %. If rejection means sorting and the costs of sorting are the same as the costs of sampling inspection per item then $\gamma = 1$ and the table shows that the optimum plan is $n = 127$ and $c = 3$. If, however, sorting costs are only half of sampling inspection costs, i.e. $\gamma = 0.5$, then the same table should be used with $N^* = 0.5 \; N = 500$ which gives the optimum plan $n = 98$ and $c = 2$.

If rejection means rework of the whole lot and the costs of rework per item equals the double of inspection costs, i.e. $\gamma = 2$, then the table should be entered with $N^* = 2N = 2000$ which gives a sampling plan of $n = 155$ and $c = 4$. Had γ been 5 instead of 2 then $N^* = 5000$ leads to $n = 207$ and $c = 6$. In this case, however, the table for $\gamma = 1$ should not be used, since the exact solution, $n = 176$, and $c = 5$ has been given in a separate table for $\gamma = 5$.

Table 2.

LTPD plans with minimum producers costs.

$100\,p_2 = 5, \quad 100\,p_1 = 2.$

Plans for $\gamma = 3$ computed from $\gamma = 1$ and $\gamma = 5$.

N	N* = 3N	n	c	N* = 0.6N	n	c
30	90	All	--	18	12	0
50	150	All	-	30	23	0
70	210	66	1	42	37	1
100	300	94	2	60	57	2
200	600	148	4	120	93	3
300	900	198	6	180	149	5
500	1500	248	8	300	178	6
700	2100	274	9	420	227	8
1000	3000	323	11	600	286	10
2000	6000	396	14	1200	358	13
3000	9000	443	16	1800	384	14
5000	15000	490	18	3000	459	17
7000	21000	513	19	4200	484	18
10000	30000	536	20	6000	531	20
20000	60000	605	23	12000	602	23
30000	90000	650	25	18000	625	24
50000	150000	695	27	30000	671	26
70000	210000	717	28	42000	694	27
100000	-	-	--	60000	739	29
200000	-	-	-	120000	806	32

6. IQL plans.

IQL plans are here defined by fixing the Indifference Quality Level, $100p_o$, and the corresponding probability of acceptance, $P(p_o)$, which is chosen as 50 per cent.

As shown in section 2 the optimum plan may always be obtained by minimizing the cost function written on standardized form which is either

$$K_o(p_1) = n + \gamma(N-n)Q(p_1), \quad p_1 < p_o, \tag{50}$$

for minimizing the producers costs, or

$$K_o(p_2) = n + \gamma(N-n)P(p_2), \quad p_2 > p_o, \tag{51}$$

for minimizing the consumers costs.

Putting $\gamma = 1$ in (50) we have the cost function considered by Weibull [2] and M Marbäck [3].

For the system defined by (50) the tables show the exact solution computed as described in section 3 for 100 p_o = 0.5, 1, 2, 3, 4, 5, 7, 10, 15, for five values of $r = p_1/p_o$ chosen among the values r = 0.2, 0.3, ..., 0.8, and for $\gamma = 1$ giving a total of 45 tables.

The remarks regarding the LTDP plans are also valid for the IQL plans with the modification that all approximations work better here. In particular it should be noted that since $c - m \approx 0.67$ the increase of n with N for given c is without practical importance apart from the case c = 0.

The hypergeometric solution has not been given for the system defined by (51) since this is of less practical importance. If, however, such a plan is desired it can be found approximately from the Poison solution which has been tabulated for both systems.

Tables are given for $\gamma = 1$ only since these may be used to find plans for all $\gamma < 10$ by means of the rule stated in section 5.

7. AQL plans with minimum consumers costs.

AQL plans are here defined by fixing the Acceptable Quality Level, 100 p_1, and the corresponding probability of acceptance, $P(p_1)$, which is chosen as 95 per cent.

As shown in section 2 the optimum plan may always be obtained by minimizing the cost function written on standardized form

$$K_o(p_2) = n + \gamma(N-n)P(p_2). \tag{52}$$

The tables show the exact solution computed as described in section 3 for 100 p_1 = 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 7, 10, for five values of $r = p_2/p_1$ chosen among the values r = 1.5, 1.7, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 10.0 (with small modifications), and for γ = 2 and 10, giving a total of 10 x 5 x 2 = 100 tables. The tables contain N, n, c, and $100P(p_2)$.

It should be noted that for this system of plans n is a decreasing function of N for given c, see (34), since $m - c < 0$. Taking this fact into account the methods of interpolation are the same as described for the LTPD plans with the modification that (49) should be replaced by

$$\frac{m(M_1)}{m(M)} = 1 + \frac{m-c}{2}\left(\frac{1}{M-0.6c} - \frac{1}{M_1-0.6c}\right)\left(1 - \frac{p_1}{2}\right) \tag{53}$$

the correction term - 0.6c having been found by numerical investigations.

The cost constant γ is defined by (7) or in the simplest case as $\gamma = k_a(p_2)/k_s(p_2)$. Usually we further have that $k_a(p) = ap$ and setting $k_s(p_2) = s$ we find $\gamma = ap_2/s$. The fraction $p_o = s/a$, i.e. the ratio between sampling inspection costs per item of the sample and the costs resulting from accepting a defective item therefore together with lot quality p_2 determines $\gamma = p_2/p_o$ in the most important case.

For $\gamma < 5$ plans should be found from $N^* = N\gamma/2$ and the tables for $\gamma = 2$, whereas for $5 \leq \gamma \leq 20$ $N^* = N\gamma/10$ and the tables for $\gamma = 10$ should be used.

As an example consider a case where sampling inspection costs per item are 15 cents and costs of accepting a defective item are 10 dollars, i.e. $p_o = 15/1000 = 0.015$. Further let AQL = 1 % and let typical bad quality be 3 % defective, i.e. $p_1 = 0.01$ and $p_2 = 0.03$. These assumptions lead to $\gamma = p_2/p_o = 2$. For lots of size 10.000 the table shows that the optimum sample size is n = 789 with c = 12. If sampling costs had been 30 cents per item instead of 15, γ would have been 1 and the sampling plan is found in the same table for $N^* = 5000$ which gives n = 645 and c = 10. For $\gamma = 4$ one similarly finds $N^* = 20.000$, n = 859 and c = 13.

8. The OC-curve.

The tables always give two points on the OC-curve.

Since p_{10}, p_{50}, and p_{95} usually have great practical interest a compact tabulation of these values - or rather of the values of n giving specified values of the three quantities - have been given in a set of separate tables based on the binomial distribution. After having found a sampling plan it is easy to look up the three points on the OC-curve in these tables.

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Single sampling tables with consumers risk of 10 % and minimum producers costs.

The tables on pp. 25 - 34 are based on a hypergeometric consumers risk of 10 %, $P(p_2) = 0.10$, a binomial producers risk, $Q(p_1) = 1-P(p_1)$, and minimum producers costs

$$K(p_1) = nk_s(p_1) + (N-n)(k_a(p_1)P(p_1) + k_r(p_1)Q(p_1))$$

$$= (k_s(p_1) - k_a(p_1)(n + (N-n)\gamma_1 Q(p_1) + N\delta_1)$$

where

$$\gamma_1 = \frac{k_r(p_1) - k_a(p_1)}{k_s(p_1) - k_a(p_1)} \quad \text{and} \quad \delta_1 = \frac{k_a(p_1)}{k_s(p_1) - k_a(p_1)} .$$

The tables give corresponding values of N, n, c and $100P(p_1)$, (if $100P(p_1) > 99.95$ it has been recorded as 100), for $\gamma_1 = 1$ and 5, and for the following 50 combinations of $100p_2$ and $100p_1$:

$100p_2$	$100p_1$				
0.5	0.05	0.1	0.15	0.2	0.25
1	0.1	0.2	0.3	0.4	0.5
2	0.2	0.4	0.6	0.8	1.0
3	0.3	0.6	0.9	1.2	1.5
4	0.8	1.2	1.6	2.0	2.4
5	1.0	1.5	2.0	2.5	3.0
7	2.1	2.8	3.5	4.2	4.9
10	3.0	4.0	5.0	6.0	7.0
15	4.5	6.0	7.5	9.0	10.5
20	6.0	8.0	10.0	12.0	14.0

Methods of interpolation have been discussed in section 5.

The tables may be used for $\gamma_1 \neq 1$ and $\gamma_1 \neq 5$ in the following way: For $\gamma_1 < 3$ compute $N^* = N\gamma_1$ and use the plan for N^* and $\gamma_1 = 1$. For $3 \leq \gamma_1 \leq 10$ compute $N^* = N\gamma_1 / 5$ and use the plan for N^* and $\gamma_1 = 5$.

The tables on pp. 35 - 37 are based on the same assumptions with the only modification that the consumers and the producers risks have been computed from the Poisson distribution. For $c \leq 99$ $m = np_2$ and $M = Np_2$ have been tabulated for $M < 50.000$ as functions of c and $r = p_1 / p_2$ for $r = 0.05, 0.10, \ldots, 0.70$ and for $\gamma_1 = 1$ and 5. The optimum plan is (c,m) for $M(c-1) < M < M(c)$.

The tables may be used for $\gamma_1 \neq 1$ and $\gamma_1 \neq 5$ in the following way: For $\gamma_1 < 3$ $M(c,\gamma_1) = M(c,1)/\gamma_1$ and for $3 \leq \gamma_1 \leq 10$ $M(c,\gamma_1) = M(c,5)\ 5/\gamma_1$.

The tables may also be used to find approximations to the plans defined above since $N = M/p_2$ and $n_h = m_h/p_2$, where

$$m_h = \left\{m - \frac{m - c}{2}\, p_2\right\} \left\{1 - \frac{m - c}{2M}\left(1 - \frac{p_2}{2}\right)\right\},$$

n_h indicating the approximation to the "hypergeometric solution."

Notice that underlining of a sampling plan means that total inspection is cheaper than sampling inspection but that the plan tabulated is the cheapest sampling plan available.

Single Sampling Tables for LTPD = 0.5 % and $\gamma = 1$.

$100p_1$	0.05			0.10			0.15			0.20			0.25		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
100	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
200	180	0	91.4	180	0	83.5	180	0	76.3	180	0	69.7	180	0	63.7
300	235	0	88.9	235	0	79.0	235	0	70.3	235	0	62.5	235	0	55.5
500	300	0	86.1	300	0	74.1	300	0	63.7	300	0	54.8	300	0	47.2
700	337	0	84.5	337	0	71.4	337	0	60.3	337	0	50.9	337	0	43.0
1000	368	0	83.2	368	0	69.2	368	0	57.6	368	0	47.9	368	0	39.8
2000	410	0	81.5	673	1	85.4	673	1	73.2	673	1	61.0	898	2	61.1
3000	706	1	95.1	706	1	84.2	951	2	82.7	951	2	70.3	1177	3	66.0
5000	733	1	94.7	994	2	92.1	1239	3	88.2	1472	4	82.5	1697	5	74.6
7000	745	1	94.6	1266	3	96.0	1507	4	92.1	1741	5	86.0	2192	7	81.2
10000	1028	2	98.5	1286	3	95.8	1774	5	94.6	2240	7	91.5	2690	9	85.8
20000	1045	2	98.4	1565	4	97.8	2296	7	97.5	2995	10	95.8	3898	14	92.9
30000	1318	3	99.5	1827	5	98.9	2553	8	98.3	3255	11	96.6	4390	16	94.5
50000	1325	3	99.5	2085	6	99.4	2809	9	98.9	3973	14	98.4	5329	20	96.9
70000	1327	3	99.5	2091	6	99.4	3055	10	99.2	4217	15	98.7	6022	23	98.0
100000	1590	4	99.9	2341	7	99.7	3298	11	99.5	4458	16	99.0	6488	25	98.5
200000	1594	4	99.9	2590	8	99.9	3543	12	99.7	5159	19	99.5	7627	30	99.3

Single Sampling Tables for LTPD = 1 % and $\gamma = 1$.

$100p_1$	0.1			0.2			0.3			0.4			0.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
50	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
70	68	0	93.4	68	0	87.3	68	0	81.5	68	0	76.1	68	0	71.1
100	90	0	91.4	90	0	83.5	90	0	76.3	90	0	69.7	90	0	63.7
200	136	0	87.3	136	0	76.2	136	0	66.5	136	0	58.0	136	0	50.6
300	160	0	85.2	160	0	72.6	160	0	61.8	160	0	52.7	160	0	44.8
500	184	0	83.2	184	0	69.2	184	0	57.5	184	0	47.8	184	0	39.8
700	195	0	82.3	195	0	67.7	316	1	75.5	316	1	63.9	316	1	53.1
1000	205	0	81.5	336	1	85.4	336	1	73.3	336	1	61.1	449	2	61.1
2000	361	1	94.9	488	2	92.4	607	3	88.8	607	3	77.3	720	4	70.7
3000	369	1	94.7	502	2	91.9	626	3	87.9	860	5	86.6	972	6	78.3
5000	513	2	98.5	642	3	95.9	886	5	94.7	1119	7	91.6	1344	9	85.8
7000	518	2	98.4	775	4	97.9	1017	6	96.4	1251	8	93.2	1590	11	89.2
10000	522	2	98.4	782	4	97.8	1147	7	97.6	1496	10	95.8	1948	14	93.0
20000	660	3	99.5	916	5	98.9	1281	8	98.3	1865	13	97.9	2430	18	95.9
30000	662	3	99.5	1043	6	99.4	1406	9	98.9	1989	14	98.4	2781	21	97.3
50000	794	4	99.9	1169	7	99.7	1648	11	99.5	2227	16	99.0	3242	25	98.5
70000	795	4	99.9	1171	7	99.7	1768	12	99.7	2460	18	99.4	3472	27	98.9
100000	796	4	99.9	1294	8	99.9	1770	12	99.7	2578	19	99.5	3811	30	99.3
200000	924	5	100	1416	9	99.9	2007	14	99.9	2923	22	99.8	4373	35	99.7

Single Sampling Tables for LTPD = 2 % and γ = 1.

$100p_1$	0.2			0.4			0.6			0.8			1.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	45	0	91.4	45	0	83.5	45	0	76.3	45	0	69.7	45	0	63.6
70	56	0	89.4	56	0	79.9	56	0	71.4	56	0	63.8	56	0	57.0
100	68	0	87.3	68	0	76.1	68	0	66.4	68	0	57.9	68	0	50.5
200	87	0	84.0	87	0	70.6	87	0	59.2	87	0	49.7	87	0	41.7
300	95	0	82.7	95	0	68.3	95	0	56.5	152	1	65.7	152	1	55.0
500	102	0	81.5	167	1	85.5	167	1	73.5	167	1	61.4	224	2	61.2
700	174	1	95.2	174	1	84.6	235	2	83.2	235	2	70.9	291	3	[illegible]
1000	180	1	94.9	243	2	92.5	303	3	88.9	303	3	77.4	359	4	70.9
2000	254	2	98.5	317	3	96.0	378	4	92.1	495	6	89.4	607	8	84.1
3000	257	2	98.5	322	3	95.8	445	5	94.6	563	7	91.4	733	10	87.7
5000	260	2	98.4	390	4	97.9	572	7	97.6	747	10	95.9	917	13	91.8
7000	328	3	99.5	455	5	98.9	576	7	97.5	811	11	96.7	1094	16	94.7
10000	329	3	99.5	457	5	98.9	639	8	98.3	873	12	97.4	1214	18	96.0
20000	396	4	99.9	521	6	99.4	762	10	99.3	1053	15	98.8	1505	23	98.0
30000	396	4	99.9	584	7	99.7	823	11	99.5	1171	17	99.2	1677	26	98.7
50000	397	4	99.9	646	8	99.9	884	12	99.7	1287	19	99.5	1904	30	99.3
70000	461	5	100	646	8	99.9	943	13	99.8	1345	20	99.6	2017	32	99.5
100000	461	5	100	707	9	99.9	1002	14	99.9	1460	22	99.8	2129	34	99.6
200000	461	5	100	767	10	100	1118	16	99.9	1630	25	99.9	2407	39	99.8

Single Sampling Tables for LTPD = 3 % and γ = 1.

$100p_1$	0.3			0.6			0.9			1.2			1.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	28	0	91.9	[illegible]	0	84.5	[illegible]	0	77.6	28	0	71.3	28	0	65.5
50	39	0	88.9	39	0	79.1	39	0	70.3	39	0	[illegible]	39	0	55.5
70	46	0	87.1	46	0	75.8	46	0	66.0	46	0	57.4	46	0	49.9
100	53	0	85.3	53	0	72.7	53	0	61.9	53	0	52.7	53	0	44.9
200	63	0	82.8	63	0	68.4	63	0	56.6	101	1	65.8	101	1	55.2
300	67	0	81.8	110	1	85.8	110	1	73.9	110	1	61.9	110	1	50.7
500	117	1	95.1	117	1	84.4	157	2	83.1	157	2	70.8	195	3	66.4
700	120	1	94.9	162	2	[illegible]	202	3	88.9	202	3	77.4	240	4	70.7
1000	122	1	94.8	166	2	92.1	208	3	88.0	286	5	86.8	323	6	78.6
2000	171	2	98.5	214	3	95.9	296	5	94.7	375	7	91.5	438	10	87.9
3000	173	2	98.4	259	4	97.9	340	6	96.4	457	9	94.8	608	13	92.1
5000	218	3	99.6	303	5	98.9	424	8	98.4	540	11	96.8	729	16	94.8
7000	219	3	99.5	304	5	98.9	426	8	98.4	620	13	98.0	846	19	96.6
10000	220	3	99.5	346	6	99.5	467	9	98.9	661	14	98.4	925	21	97.4
20000	264	4	99.9	388	7	99.7	548	11	99.5	779	17	99.3	1117	26	98.8
30000	264	4	99.9	429	8	99.9	588	12	99.7	857	19	99.6	1230	29	99.2
50000	307	5	100	430	8	99.9	628	13	99.8	[illegible]	21	99.7	1343	32	99.5
70000	307	5	100	470	9	99.9	667	14	99.9	972	22	99.8	1455	35	99.7
100000	307	5	100	471	9	99.9	706	15	99.9	1010	23	99.8	1529	37	99.8
200000	349	6	100	511	10	100	783	17	100	1123	26	99.9	1677	41	99.9

Single Sampling Tables for LTPD = 4 % and $\gamma = 1$.

100p₁	0.8			1.2			1.6			2.0			2.4		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	26	0	81.2	26	0	73.1	26	0	65.7	26	0	59.1	26	0	53.2
50	34	0	76.1	34	0	66.3	34	0	57.8	34	0	50.3	34	0	43.8
70	39	0	73.1	39	0	62.4	39	0	53.3	39	0	45.5	39	0	38.8
100	43	0	70.8	43	0	59.5	43	0	50.0	43	0	41.9	43	0	35.2
200	80	1	86.5	80	1	75.1	80	1	63.3	80	1	52.3	80	1	42.5
300	85	1	85.2	85	1	72.8	115	2	72.0	115	2	59.5	115	2	47.7
500	121	2	92.6	121	2	82.2	151	3	77.6	179	4	71.1	206	5	62.6
700	124	2	92.2	155	3	88.3	184	4	82.6	240	6	79.3	267	7	68.7
1000	158	3	96.1	188	4	92.3	247	6	89.6	275	7	81.1	330	9	72.8
2000	193	4	98.0	254	6	96.5	341	9	95.0	426	12	91.0	536	16	84.8
3000	195	4	97.9	286	7	97.7	374	10	95.9	515	15	94.2	680	21	89.9
5000	227	5	99.0	318	8	98.4	435	12	97.5	605	18	96.2	853	27	93.7
7000	259	6	99.5	349	9	99.0	495	14	98.5	692	21	97.5	967	31	95.4
10000	260	6	99.5	380	10	99.3	525	15	98.8	751	23	98.1	1080	35	96.7
20000	291	7	99.7	440	12	99.7	613	18	99.4	893	28	99.1	1332	44	98.4
30000	322	8	99.9	470	13	99.8	671	20	99.7	978	31	99.4	1470	49	99.0
50000	352	9	99.9	499	14	99.9	728	22	99.8	1062	34	99.7	1635	55	99.4
70000	352	9	99.9	529	15	99.9	757	23	99.8	1118	36	99.7	1744	59	99.6
100000	382	10	100	558	16	99.9	785	24	99.9	1201	39	99.8	1853	63	99.7
200000	412	11	100	587	17	100	870	27	99.9	1311	43	99.9	2069	71	99.9

Single Sampling Tables for LTPD = 5 % and $\gamma = 1$.

100p₁	1.0			1.5			2.0			2.5			3.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	23	0	79.4	23	0	70.6	23	0	62.8	23	0	55.9	23	0	49.6
50	30	0	74.0	30	0	63.5	30	0	54.5	30	0	46.8	30	0	40.1
70	33	0	71.8	33	0	60.7	33	0	51.3	33	0	43.4	33	0	36.6
100	36	0	69.6	36	0	58.0	36	0	48.3	36	0	40.2	36	0	33.4
200	66	1	85.9	66	1	73.9	66	1	61.9	89	2	61.5	89	2	49.8
300	70	1	84.5	94	2	83.2	94	2	70.9	117	3	66.4	117	3	53.3
500	98	2	92.4	123	3	88.5	146	4	83.0	168	5	75.5	190	6	65.5
700	125	3	96.3	149	4	92.5	173	5	86.5	218	7	81.8	239	8	70.8
1000	127	3	96.1	176	5	94.9	222	7	92.0	267	9	86.5	311	11	77.3
2000	155	4	98.0	204	6	96.5	274	9	94.9	365	13	92.2	475	18	87.2
3000	181	5	99.0	229	7	97.7	323	11	96.9	436	16	95.0	590	23	91.5
5000	207	6	99.5	279	9	99.0	372	13	98.1				728	29	94.7
7000	207	6	99.5	303	10	99.3	419	15	98.9	577	22	97.9	840	34	96.5
10000	232	7	99.7	304	10	99.3	443	16	99.1	645	25	98.7	931	38	97.4
20000	257	8	99.9	352	12	99.7	513	19	99.6	737	29	99.3	1131	47	98.8
30000	257	8	99.9	375	13	99.8	536	20	99.7	804	32	99.5	1219	51	99.2
50000	281	9	99.9	399	14	99.9	582	22	99.8	871	35	99.7	1351	57	99.5
70000	281	9	99.9	422	15	99.9	627	24	99.9	916	37	99.8	1438	61	99.6
100000	305	10	100	445	16	99.9	650	25	99.9	982	40	99.9	1524	65	99.8
200000	329	11	100	492	18	100	717	28	100	1070	44	99.9	1697	73	99.9

Single Sampling Tables for LTPD = 7 % and $\gamma = 1$.

$100p_1$	2.1			2.8			3.5			4.2			4.9		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	20	0	65.4	20	0	56.7	20	0	49.0	20	0	42.4	20	0	36.6
50	23	0	61.4	23	0	52.0	23	0	44.1	23	0	37.3	23	0	31.5
70	25	0	58.8	25	0	49.2	25	0	41.0	25	0	34.2	25	0	28.5
100	44	1	76.4	44	1	65.0	44	1	54.1	44	1	44.3	44	1	35.8
200	66	2	83.8	66	2	71.8	82	3	67.7	82	3	54.7	82	3	42.5
300	86	3	89.2	86	3	77.9	102	4	71.4	118	5	62.4	118	5	47.8
500	106	4	92.7	123	5	86.8	155	7	82.2	170	8	71.3	201	10	60.2
700	125	5	95.1	142	6	89.5	190	9	86.8	221	11	77.9	252	13	64.6
1000	127	5	94.8	177	8	93.7	225	11	90.1	272	14	82.6	348	19	73.6
2000	163	7	97.7	230	11	97.0	294	15	94.4	404	22	91.1	542	31	83.8
3000	181	8	98.5	248	12	97.6	345	18	96.3	486	27	94.0	685	40	88.8
5000	216	10	99.4	282	14	98.6	411	22	98.0	584	33	96.3	875	52	93.1
7000	216	10	99.4	315	16	99.2	444	24	98.5	648	37	97.4	1000	60	95.0
10000	233	11	99.6	332	17	99.4	493	27	99.1	727	42	98.3	1140	69	96.6
20000	267	13	99.8	382	20	99.7	557	31	99.5	854	50	99.1	1403	86	98.4
30000	284	14	99.9	414	22	99.8	605	34	99.7	932	55	99.4	1542	95	98.9
50000	301	15	99.9	431	23	99.9	653	37	99.8	1025	61	99.7			
70000	317	16	100	463	25	99.9	684	39	99.9	1072	64	99.8			
100000	334	17	100	479	26	99.9	716	41	99.9	1134	68	99.8			
200000	350	18	100	527	29	100	794	46	100	1257	76	99.9			

Single Sampling Tables for LTPD = 10 % and $\gamma = 1$.

$100p_1$	3.0			4.0			5.0			6.0			7.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	16	0	61.4	16	0	52.0	16	0	44.0	16	0	37.2	16	0	31.3
50	18	0	57.8	18	0	48.0	18	0	39.7	18	0	32.8	18	0	27.1
70	31	1	76.2	31	1	64.6	31	1	53.7	31	1	43.8	31	1	35.1
100	33	1	74.0	33	1	61.7	44	2	62.1	44	2	50.4	44	2	39.7
200	48	2	82.6	59	3	79.0	71	4	71.8	81	5	64.1	81	5	49.6
300	61	3	88.9	85	5	87.5	96	6	79.5	107	7	68.7	117	8	56.5
500	87	5	95.3	99	6	89.8	132	9	87.4	154	11	78.5	186	14	67.7
700	88	5	95.1	123	8	94.1	157	11	90.4	190	14	83.0	233	18	72.2
1000	101	6	96.7	136	9	95.3	181	13	92.9	236	18	88.0	300	24	78.9
2000	126	8	98.6	172	12	97.8	240	18	96.6	328	26	93.9	457	38	88.2
3000	138	9	99.1	196	14	98.7	264	20	97.5	385	31	95.9	567	48	92.3
5000	151	10	99.4	220	16	99.2	310	24	98.6	452	37	97.6	699	60	95.3
7000	163	11	99.6	232	17	99.4	333	26	99.0	497	41	98.3	786	68	96.7
10000	174	12	99.8	243	18	99.5	355	28	99.3	541	45	98.8	873	76	97.7
20000	198	14	99.9	278	21	99.8	411	33	99.7	629	53	99.4	1045	92	98.9
30000	198	14	99.9	289	22	99.8	434	35	99.8	683	58	99.6			
50000	221	16	100	312	24	99.9	467	38	99.9	738	63	99.8			
70000	221	16	100	334	26	99.9	500	41	99.9	781	67	99.8			
100000	233	17	100	345	27	100	522	43	99.9	824	71	99.9			
200000	255	19	100	368	29	100	565	47	100	899	78	99.9			

Single Sampling Tables for LTPD = 15 % and γ = 1.

$100p_1$	4.5			6.0			7.5			9.0			10.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	11	0	60.3	11	0	50.6	11	0	42.4	11	0	35.4	11	0	29.5
50	20	1	77.3	20	1	66.0	20	1	55.1	20	1	45.2	20	1	36.4
70	22	1	74.0	29	2	74.9	29	2	62.8	29	2	50.9	29	2	40.0
100	30	2	84.9	30	2	73.2	38	3	68.2	38	3	55.0	45	4	48.3
200	40	3	89.6	48	4	84.1	63	6	80.8	70	7	70.7	78	8	56.5
300	49	4	93.1	65	6	90.6	80	8	85.5	94	10	77.6	109	12	64.3
500	58	5	95.4	81	8	94.6	104	11	91.0	133	15	85.7	162	19	74.5
700	67	6	96.9	90	9	95.7	120	13	93.4	157	18	88.6	207	25	80.6
1000	75	7	98.1	106	11	97.5	136	15	95.1	187	22	92.2	259	32	85.8
2000	91	9	99.2	122	13	98.5	175	20	97.8	248	30	96.1	362	46	92.4
3000	99	10	99.5	138	15	99.1	190	22	98.4	285	35	97.5	435	56	95.1
5000	107	11	99.7	153	17	99.5	220	26	99.2	330	41	98.5	515	67	97.0
7000	115	12	99.8	161	18	99.6	236	28	99.4	352	44	98.9	573	75	97.9
10000	123	13	99.9	169	19	99.7	250	30	99.6	381	48	99.2	630	83	98.6
20000	131	14	99.9	191	22	99.9	280	34	99.8	439	56	99.7	737	98	99.3
30000	139	15	99.9	199	23	99.9	302	37	99.9	468	60	99.8			
50000	146	16	100	214	25	99.9	324	40	99.9	504	65	99.9			
70000	154	17	100	221	26	100	339	42	99.9	533	69	99.9			
100000	162	18	100	236	28	100	353	44	100	554	72	99.9			
200000	169	19	100	251	30	100	382	48	100	604	79	100			

Single Sampling Tables for LTPD = 20 % and γ = 1.

$100p_1$	6.0			8.0			10.0			12.0			14.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	9	0	57.3	14	1	69.0	14	1	58.5	14	1	48.6	14	1	39.7
50	16	1	75.1	16	1	63.0	21	2	64.8	21	2	53.0	21	2	42.0
70	22	2	85.8	22	2	74.4	28	3	69.5	28	3	56.2	28	3	43.5
100	23	2	84.3	29	3	80.1	35	4	73.1	40	5	65.4	40	5	50.4
200	36	4	93.8	42	5	88.4	53	7	84.4	64	9	76.6	75	11	64.4
300	43	5	95.8	54	7	93.6	66	9	88.0	82	12	82.0	103	16	73.0
500	49	6	97.4	67	9	96.0	84	12	92.6	111	17	88.6	149	24	80.7
700	56	7	98.2	73	10	97.0	101	15	95.7	134	21	92.1	182	30	85.8
1000	62	8	98.9	79	11	97.7	113	17	96.8	157	25	94.4	221	37	89.6
2000	68	9	99.3	97	14	99.0	136	21	98.4	196	32	97.2	298	51	94.6
3000	74	10	99.5	103	15	99.2	153	24	99.0	224	37	98.2	347	60	96.4
5000	80	11	99.7	114	17	99.6	170	27	99.4	252	42	98.9	407	71	97.9
7000	86	12	99.8	126	19	99.8	181	29	99.6	274	46	99.2	444	78	98.5
10000	92	13	99.9	131	20	99.8	192	31	99.7	296	50	99.5	487	86	99.0
20000	97	14	99.9	143	22	99.9	214	35	99.9	334	57	99.7			
30000	103	15	100	154	24	99.9	225	37	99.9	355	61	99.8			
50000	109	16	100	159	25	100	242	40	99.9	382	66	99.9			
70000	115	17	100	165	26	100	253	42	100	398	69	99.9			
100000	120	18	100	176	28	100	264	44	100	414	72	99.9			
200000	126	19	100	187	30	100	285	48	100	452	79	100			

Single Sampling Tables for LTPD = 0.5 % and γ = 5.

$100p_1$	0.05			0.10			0.15			0.20			0.25		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
70	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
100	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
200	180	0	91.4	180	0	83.5	180	0	76.3	180	0	69.7	180	0	63.7
300	235	0	88.9	235	0	79.1	235	0	70.3	235	0	62.5	235	0	55.5
500	300	0	86.1	438	1	92.8	438	1	85.9	438	1	78.6	438	1	70.1
700	516	1	97.2	516	1	90.5	639	2	92.7	639	2	86.2	639	2	79.2
1000	583	1	96.5	753	2	95.9	753	2	89.5	887	3	89.6	979	4	89.8
2000	898	2	98.9	1102	3	97.4	1291	4	95.3	1465	5	92.3	1624	6	88.3
3000	951	2	98.7	1177	3	96.8	1594	5	96.5	1788	6	92.9	2152	8	90.5
5000	994	2	98.6	1472	4	98.3	1915	6	97.3	2538	9	96.5	3123	12	94.5
7000	1266	3	99.6	1741	5	99.1	2192	7	98.1	2837	10	97.0	3655	14	95.4
10000	1286	3	99.6	1774	5	99.0	2467	8	98.6	3345	12	98.0	4394	17	96.8
20000	1565	4	99.9	2296	7	99.7	2995	10	99.3	4120	15	98.9	5853	23	98.5
30000	1576	4	99.9	2315	7	99.7	3255	11	99.5	4613	17	99.3	6583	26	99.0
50000	1584	4	99.9	2571	8	99.9	3743	13	99.8	5329	20	99.7	7530	30	99.4
70000	1842	5	100	2578	8	99.9	3987	14	99.9	5575	21	99.7	8222	33	99.6
100000	1845	5	100	2824	9	99.9	4229	15	99.9	6041	23	99.8	8691	35	99.7
200000	2099	6	100	3070	10	100	4473	16	99.9	6513	25	99.9	9827	40	99.9

Single Sampling Tables for LTPD = 1 % and γ = 5.

$100p_1$	0.1			0.2			0.3			0.4			0.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
70	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
100	90	0	91.4	90	0	83.5	90	0	76.3	90	0	69.7	90	0	63.7
200	136	0	87.3	190	1	94.4	190	1	88.8	190	1	82.3	190	1	75.4
300	241	1	97.5	241	1	91.5	241	1	83.6	290	2	88.8	290	2	82.2
500	291	1	96.5	376	2	95.9	376	2	89.5	444	3	89.6	490	4	89.8
700	316	1	96.0	417	2	94.8	504	3	93.3	581	4	91.4	645	5	89.2
1000	449	2	98.9	551	3	97.4	645	4	95.3	732	5	92.4	812	6	88.4
2000	488	2	98.7	720	4	98.4	933	6	97.6	1133	8	95.9	1322	10	92.7
3000	626	3	99.6	745	4	98.2	1082	7	98.2	1397	10	97.2	1697	13	95.0
5000	642	3	99.6	886	5	99.0	1232	8	98.7	1671	12	98.1	2196	17	96.9
7000	649	3	99.6	1017	6	99.5	1365	9	99.1	1921	14	98.8	2561	20	97.9
10000	782	4	99.9	1147	7	99.7	1496	10	99.4	2059	15	99.0	2925	23	98.5
20000	789	4	99.9	1281	8	99.9	1750	12	99.7	2542	19	99.6	3530	28	99.2
30000	919	5	100	1286	8	99.9	1874	13	99.8	2669	20	99.7	3883	31	99.5
50000	921	5	100	1411	9	99.9	1997	14	99.9	3019	23	99.8	4344	35	99.7
70000	923	5	100	1532	10	100	2117	15	99.9	3137	24	99.9	4683	38	99.8
100000	1049	6	100	1534	10	100	2235	16	99.9	3255	25	99.9	4911	40	99.9
200000	1050	6	100	1655	11	100	2468	18	100	3597	28	100	5469	45	99.9

Single Sampling Tables for LTPD = 2 % and $\gamma = 5$.

$100p_1$	0.2			0.4			0.6			0.8			1.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	45	0	91.4	45	0	83.5	45	0	76.3	45	0	69.7	45	0	63.6
70	56	0	89.4	56	0	79.9	56	0	71.4	56	0	63.8	56	0	57.0
100	68	0	87.3	95	1	94.4	95	1	88.8	95	1	82.3	95	1	75.4
200	135	1	97.0	135	1	89.8	171	2	91.5	171	2	84.2	195	3	86.7
300	152	1	96.2	199	2	95.3	239	3	94.3	239	3	87.3	272	4	86.1
500	224	2	98.9	275	3	97.5	322	4	95.4	366	5	92.4	406	6	88.4
700	235	2	98.8	291	3	97.0	393	5	96.7	441	6	93.3	529	8	91.2
1000	243	2	98.7	359	4	98.4	466	6	97.6	566	8	95.9	661	10	92.8
2000	317	3	99.6	437	5	99.1	607	8	98.8	769	11	97.7	975	15	96.0
3000	322	3	99.6	505	6	99.5	677	9	99.1	898	13	98.5	1163	18	97.2
5000	390	4	99.9	513	6	99.5	747	10	99.4	1028	15	99.0	1461	23	98.6
7000	392	4	99.9	576	7	99.7	811	11	99.6	1149	17	99.4	1586	25	98.9
10000	394	4	99.9	639	8	99.9	873	12	99.7	1214	18	99.5	1763	28	99.2
20000	459	5	100	703	9	99.9	996	14	99.9	1449	22	99.8	2056	33	99.6
30000	460	5	100	705	9	99.9	1056	15	99.9	1510	23	99.8	2228	36	99.7
50000	523	6	100	766	10	100	1116	16	99.9	1625	25	99.9	2453	40	99.9
70000	523	6	100	825	11	100	1174	17	100	1739	27	99.9	2566	42	99.9
100000	524	6	100	826	11	100	1232	18	100	1796	28	100	2732	45	99.9
200000	586	7	100	886	12	100	1291	19	100	1965	31	100	2954	49	100

Single Sampling Tables for LTPD = 3 % and $\gamma = 5$.

$100p_1$	0.3			0.6			0.9			1.2			1.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	39	0	88.9	39	0	78.9	39	0	70.1	39	0	62.4	39	0	55.5
70	46	0	87.1	65	1	94.2	65	1	88.4	65	1	81.6	65	1	74.5
100	80	1	97.6	80	1	91.6	80	1	83.8	97	2	88.8	97	2	82.1
200	101	1	96.3	133	2	95.3	159	3	94.4	159	3	87.4	181	4	86.2
300	110	1	95.6	146	2	94.2	179	3	92.1	236	5	93.3	261	6	90.0
500	157	2	98.8	195	3	96.9	265	5	96.6	297	6	93.1	358	8	90.7
700	162	2	98.7	240	4	98.4	312	6	97.6	379	8	95.8	444	10	92.5
1000	208	3	99.6	247	4	98.3	359	7	98.3	465	10	97.3	565	13	95.1
2000	214	3	99.6	336	6	99.5	451	9	99.1	598	13	98.5	775	18	97.2
3000	259	4	99.9	340	6	99.5	496	10	99.4	682	15	99.0	933	22	98.4
5000	261	4	99.9	384	7	99.7	540	11	99.6	766	17	99.4	1094	26	99.0
7000	262	4	99.9	426	8	99.9	582	12	99.7	846	19	99.6	1175	28	99.3
10000	305	5	100	427	8	99.9	623	13	99.8	887	20	99.7	1292	31	99.5
20000	306	5	100	469	9	99.9	703	15	99.9	1005	23	99.9	1484	36	99.8
30000	306	5	100	509	10	100	743	16	99.9	1082	25	99.9	1597	39	99.8
50000	348	6	100	549	11	100	782	17	100	1158	27	99.9	1709	42	99.9
70000	348	6	100	550	11	100	821	18	100	1196	28	100	1820	45	99.9
100000	349	6	100	589	12	100	859	19	100	1234	29	100	1894	47	100
200000	390	7	100	629	13	100	897	20	100	1346	32	100	2041	51	100

Single Sampling Tables for LTPD = 4 % and γ = 5.

$100p_1$	0.8			1.2			1.6			2.0			2.4		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	47	1	94.5	47	1	89.1	47	1	82.7	47	1	75.8	47	1	68.8
70	58	1	92.1	58	1	84.6	58	1	76.7	58	1	68.3	58	1	59.3
100	67	1	89.9	85	2	91.7	85	2	84.4	85	2	76.1	85	2	66.6
200	107	2	94.5	130	3	92.8	151	4	90.4	170	5	87.3	186	6	83.8
300	141	3	97.3	167	4	94.8	213	6	94.3	234	7	90.0	271	9	88.0
500	179	4	98.5	232	6	97.7	232	8	96.0	330	10	92.9	396	13	90.1
700	184	4	98.3	240	6	97.3	320	9	96.5	395	12	94.3	489	16	91.5
1000	218	5	99.1	303	8	98.8	383	11	97.8	487	15	96.1	634	21	94.2
2000	254	6	99.5	341	9	99.1	481	14	98.8	669	21	98.2	902	30	96.8
3000	286	7	99.8	403	11	99.6	543	16	99.2	761	24	98.8	1077	36	97.9
5000	318	8	99.9	435	12	99.7	605	18	99.5	880	28	99.3	1280	43	98.7
7000	320	8	99.9	466	13	99.8	664	20	99.7	940	30	99.4	1422	48	99.1
10000	350	9	99.9	496	14	99.9	695	21	99.8	1026	33	99.6	1564	53	99.4
20000	381	10	100	527	15	99.9	782	24	99.9	1168	38	99.8	1815	62	99.7
30000	382	10	100	557	16	99.9	839	26	99.9	1253	41	99.9	1954	67	99.8
50000	412	11	100	614	18	100	896	28	100	1336	44	99.9	2118	73	99.9
70000	412	11	100	615	18	100	924	29	100	1392	46	99.9	2227	77	99.9
100000	441	12	100	644	19	100	953	30	100	1447	48	100	2335	81	99.9
200000	471	13	100	701	21	100	1036	33	100	1584	53	100	2550	89	100

Single Sampling Tables for LTPD = 5 % and γ = 5.

$100p_1$	1.0			1.5			2.0			2.5			3.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	44	1	92.8	44	1	85.9	44	1	78.4	44	1	70.4	44	1	61.8
70	51	1	90.8	64	2	92.8	64	2	86.3	62	2	79.3	62	2	71.8
100	75	2	96.0	75	2	89.7	88	3	90.0	88	3	82.1	88	3	73.3
200	109	3	97.6	128	4	95.6	146	5	92.6	162	6	88.7	189	8	88.3
300	117	3	97.0	158	5	96.7	178	6	93.2	214	8	90.9	248	10	87.1
500	146	4	98.4	190	6	97.5	252	9	96.8	311	12	94.9	366	15	91.2
700	173	5	99.2	218	7	98.2	282	10	97.2	364	14	95.7	461	19	93.3
1000	176	5	99.1	245	8	98.8	332	12	98.2	437	17	97.1	558	23	94.7
2000	204	6	99.5	297	10	99.4	410	15	99.1	561	22	98.4	792	33	97.4
3000	229	7	99.8	323	11	99.6	459	17	99.4	634	25	98.9	931	39	98.3
5000	255	8	99.9	349	12	99.7	508	19	99.6	728	29	99.4	1092	46	99.0
7000	256	8	99.9	373	13	99.8	554	21	99.8	797	32	99.6	1184	50	99.2
10000	280	9	99.9	397	14	99.9	579	22	99.8	844	34	99.7	1296	55	99.5
20000	305	10	100	444	16	100	648	25	99.9	957	39	99.9	1496	64	99.8
30000	305	10	100	468	17	100	671	26	99.9	1024	42	99.9	1606	69	99.8
50000	329	11	100	491	18	100	716	28	100	1090	45	99.9	1737	75	99.9
70000	352	12	100	514	19	100	761	30	100	1135	47	100	1823	79	99.9
100000	353	12	100	537	20	100	784	31	100	1200	50	100	1910	83	100
200000	376	13	100	560	21	100	850	34	100	1288	54	100	2082	91	100

Single Sampling Tables for LTPD = 7 % and γ = 5.

$100p_1$	2.1			2.8			3.5			4.2			4.9		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	46	2	92.8	46	2	86.2	46	2	78.7	46	2	70.2	46	2	60.7
70	53	2	90.0	63	3	90.0	63	3	82.1	63	3	72.9	63	3	62.7
100	71	3	93.7	83	4	91.6	92	5	89.6	92	5	79.6	92	5	67.5
200	111	5	97.0	125	6	93.7	150	8	91.8	173	10	88.6	192	12	85.0
300	133	6	97.7	162	8	96.0	189	10	93.0	228	13	89.8	274	17	87.1
500	155	7	98.3	201	10	97.3	259	14	95.9	328	19	93.6	406	25	89.8
700	174	8	98.8	237	12	98.3	297	16	96.6	397	23	95.0	506	31	91.3
1000	193	9	99.2	257	13	98.6	348	19	97.8	481	28	96.5	636	39	93.3
2000	230	11	99.6	310	16	99.3	451	25	99.0	632	37	98.1	925	57	96.4
3000	248	12	99.7	345	18	99.6	502	28	99.3	731	43	98.8	1102	68	97.5
5000	266	13	99.8	379	20	99.7	568	32	99.6	844	50	99.3	1338	83	98.6
7000	283	14	99.9	412	22	99.8	601	34	99.7	909	54	99.5	1480	92	99.0
10000	300	15	99.9	429	23	99.9	634	36	99.8	988	59	99.7			
20000	333	17	100	478	26	99.9	714	41	99.9	1115	67	99.8			
30000	333	17	100	494	27	100	762	44	99.9	1192	72	99.9			
50000	366	19	100	527	29	100	809	47	100	1285	78	99.9			
70000	366	19	100	559	31	100	840	49	100	1347	82	100			
100000	383	20	100	575	32	100	872	51	100	1408	86	100			
200000	415	22	100	606	34	100	934	55	100	1516	93	100			

Single Sampling Tables for LTPD = 10 % and γ = 5.

$100p_1$	3.0			4.0			5.0			6.0			7.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	37	2	90.1	44	3	90.2	44	3	82.3	All	-	-	All	-	-
70	50	3	93.7	58	4	91.8	64	5	90.0	64	5	81.5	All	-	-
100	64	4	95.7	72	5	93.2	81	6	88.9	88	7	84.2	All	-	-
200	81	5	96.5	102	7	94.8	131	10	93.5	158	13	90.6	181	16	86.6
300	107	7	98.4	128	9	96.7	168	13	95.7	206	17	92.8	250	22	89.0
500	121	8	98.9	165	12	98.4	207	16	96.8	278	23	95.2	354	31	91.6
700	134	9	99.3	179	13	98.7	243	19	97.9	326	27	96.3	444	39	93.7
1000	147	10	99.5	203	15	99.2	279	22	98.6	384	32	97.4	546	48	95.4
2000	172	12	99.8	240	18	99.6	339	27	99.3	499	42	98.8	748	66	97.6
3000	185	13	99.8	253	19	99.7	374	30	99.5	556	47	99.2	870	77	98.4
5000	197	14	99.9	276	21	99.8	409	33	99.7	635	54	99.5	1024	91	99.1
7000	209	15	99.9	299	23	99.9	442	36	99.8	679	58	99.7			
10000	221	16	100	311	24	99.9	465	38	99.9	724	62	99.8			
20000	232	17	100	345	27	100	510	42	99.9	811	70	99.9			
30000	244	18	100	356	28	100	543	45	100	866	75	99.9			
50000	255	19	100	379	30	100	576	48	100	920	80	100			
70000	267	20	100	390	31	100	598	50	100	963	84	100			
100000	278	21	100	412	33	100	619	52	100	995	87	100			
200000	289	22	100	434	35	100	663	56	100	1080	95	100			

Single Sampling Tables for LTPD = 15 % and γ = 5.

$100p_1$	4.5			6.0			7.5			9.0			10.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	24	2	90.9	All	-	-	All	-	-	All	-	-	All	-	-
50	34	3	93.5	39	4	91.8	44	5	89.1	All	-	-	All	-	-
70	43	4	95.7	49	5	92.8	54	6	89.2	64	8	88.1	All	-	-
100	52	5	97.1	58	6	94.2	71	8	91.7	82	10	88.3	92	12	83.4
200	63	6	97.7	85	9	96.9	105	12	94.9	137	17	93.3	166	22	89.7
300	80	8	99.0	101	11	98.2	129	15	96.8	170	21	94.6	220	29	91.7
500	89	9	99.3	119	13	98.8	162	19	98.1	224	28	97.0	303	40	94.4
700	98	10	99.5	135	15	99.3	185	22	98.8	255	32	97.8	364	48	95.7
1000	106	11	99.7	143	16	99.4	202	24	99.0	294	37	98.4	431	57	97.0
2000	115	12	99.8	167	19	99.7	241	29	99.5	362	46	99.3	565	75	98.5
3000	123	13	99.9	175	20	99.8	264	32	99.7	400	51	99.5	638	85	99.0
5000	131	14	99.9	191	22	99.9	286	35	99.8	444	57	99.7	733	98	99.4
7000	138	15	99.9	206	24	99.9	301	37	99.9	467	60	99.8			
10000	146	16	100	214	25	99.9	316	39	99.9	496	64	99.8			
20000	161	18	100	229	27	100	346	43	100	554	72	99.9			
30000	161	18	100	244	29	100	368	46	100	582	76	100			
50000	177	20	100	258	31	100	389	49	100	618	81	100			
70000	177	20	100	266	32	100	404	51	100	647	85	100			
100000	184	21	100	273	33	100	418	53	100	668	88	100			
200000	199	23	100	288	35	100	447	57	100	718	95	100			

Single Sampling Tables for LTPD = 20 % and γ = 5.

$100p_1$	6.0			8.0			10.0			12.0			14.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	19	2	89.8	23	3	89.3	All	-	-	All	-	-	All	-	-
50	31	4	96.4	36	5	93.6	40	6	90.0	44	7	84.9	All	-	-
70	33	4	95.5	43	6	94.7	52	8	92.9	60	10	90.1	All	-	-
100	40	5	96.9	50	7	95.6	65	10	94.3	74	12	89.8	90	16	88.0
200	53	7	98.7	70	10	97.7	90	14	96.7	115	19	94.4	148	26	91.1
300	60	8	99.1	82	12	98.7	109	17	97.7	145	24	96.0	194	34	93.2
500	67	9	99.4	95	14	99.2	133	21	98.7	180	30	97.5	256	45	95.6
700	73	10	99.6	101	15	99.4	145	23	99.0	208	35	98.5	306	54	97.0
1000	79	11	99.7	113	17	99.6	157	25	99.3	232	39	98.8	351	62	97.7
2000	91	13	99.9	125	19	99.8	185	30	99.7	277	47	99.4	450	80	99.0
3000	97	14	99.9	136	21	99.9	197	32	99.8	305	52	99.6	500	89	99.3
5000	103	15	100	148	23	99.9	219	36	99.9	338	58	99.8			
7000	103	15	100	154	24	99.9	230	38	99.9	354	61	99.8			
10000	109	16	100	159	25	100	242	40	99.9	376	65	99.9			
20000	120	18	100	176	28	100	263	44	100	414	72	99.9			
30000	126	19	100	182	29	100	274	46	100	435	76	100			
50000	131	20	100	193	31	100	291	49	100	462	81	100			
70000	132	20	100	198	32	100	302	51	100	478	84	100			
100000	137	21	100	204	33	100	312	53	100	499	88	100			
200000	148	23	100	215	35	100	329	56	100	531	94	100			

Single Sampling Tables with Consumer's Risk of 10 %

$B(c,m) = 0.10$, $r = p_1/p_2$, $m = np_2$, $M = Np_2$, $\gamma = 1$.

	r	0.70	0.65	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.25	0.20
c	m	M	M	M	M	M	M	M	M	M	M	M
0	2.302	10.9	10.0	9.43	8.99	8.67	8.47	8.36	8.36	8.48	8.75	9.28
1	3.889	14.9	13.9	13.3	12.9	12.7	12.7	12.9	13.3	14.1	15.6	18.2
2	5.322	18.5	17.5	16.9	16.7	16.7	17.1	17.8	19.1	21.4	25.5	33.6
3	6.681	21.9	21.0	20.5	20.5	20.9	21.8	23.5	26.4	31.4	41.0	62.0
4	7.993	[illegible]	24.5	24.2	24.5	25.4	27.2	30.3	35.6	45.4	65.7	116
5	9.274	28.7	28.0	28.0	28.7	30.4	33.3	38.5	47.6	65.6	106	220
6	10.53	32.0	31.5	31.9	33.2	35.8	40.4	48.4	63.5	95.1	173	425
7	11.77	35.3	35.1	35.9	37.9	41.8	48.5	60.7	84.7	138	286	829
8	12.99	38.7	38.8	40.1	43.1	48.5	58.1	76.1	113	203	476	1640
9	14.21	42.1	42.5	44.5	48.6	55.9	69.2	95.2	152	300	798	3240
10	15.41	45.6	46.4	49.2	54.6	64.3	82.5	119	205	446	1350	6470
11	16.60	49.1	50.4	54.1	61.0	73.8	98.3	150	277	665	2280	13000
12	17.78	52.6	54.6	59.3	68.1	84.5	117	189	377	1000	3890	26100
13	18.96	56.2	58.8	64.7	75.8	96.7	139	238	514	1510	6650	52700
14	20.13	59.9	63.3	70.6	84.2	111	166	302	703	2280	11400	
15	21.29	63.6	67.9	76.7	93.4	126	199	383	965	3450	19600	
16	22.45	67.5	72.7	83.3	104	145	238	487	1330	5240	33800	
17	23.61	71.5	77.8	90.4	115	166	285	622	1840	7990	58500	
18	24.76	75.4	82.8	97.7	127	190	342	794	2540	12200		
19	25.90	79.6	88.3	106	141	217	412	1020	3510	18600		
20	27.04	83.9	94.1	114	156	250	496	1310	4880	28600		
22	29.32	92.6	106	133	191	329	722	2160	9450	67400		
24	31.58	102	119	155	235	435	[illegible]	[illegible]	[illegible]			
26	33.84	112	134	180	288	578	1560	6000	35900			
28	36.08	122	150	210	355	772	2300	10100				
30	38.31	133	168	245	439	1040	3420	17000				
35	43.87	164	221	358	750	2170	9300	63300				
40	49.39	200	290	529	1300	4650	25700					
45	54.88	243	381	784	2280	10000						
50	60.34	295	504	1180	4050	21900						
60	71.20	431	887	2690	13000							
70	81.99	632	1580	6320	42900							
80	92.72	932	2880	15100								
90	103.4	1390	5300	36400								
99	113.0	2000	9280									

	r	0.15	0.10	0.05
c	m	M	M	M
0	2.302	10.3	12.5	19.2
1	3.889	23.6	37.7	106
2	5.322	52.8	117	629
3	6.681	121	382	3900
4	7.993	285	1280	24800
5	9.274	684	4380	159000
6	10.53	1670	15100	
7	11.77	4100	52700	
8	12.99	10200		
9	14.21	25400		
10	15.41	63900		

Single Sampling Tables with Consumers Risk of 10 %

$B(c,m) = 0.10$, $r = p_1/p_2$, $m = np_2$, $M = Np_2$, $\gamma = 5$.

	r	0.70	0.65	0.60	0.55	0.50	0.45	0.40
c	m	M	M	M	M	M	M	M
0	2.302	3.89	3.89	3.89	3.89	3.89	3.89	3.89
1	3.889	5.32	5.32	5.32	5.32	5.32	5.32	5.32
2	5.322	6.68	6.68	6.68	6.68	6.68	6.68	6.68
3	6.681	7.99	7.99	7.99	7.99	7.99	7.99	7.99
4	7.993	9.27	9.27	9.27	9.27	9.27	9.27	9.27
5	9.274	10.5	10.5	10.5	10.5	10.5	10.5	11.5
6	10.53	11.8	11.8	11.8	11.8	11.8	11.8	14.6
7	11.77	13.0	13.0	13.0	13.0	13.0	14.4	18.1
8	12.99	14.2	14.2	14.2	14.2	14.2	17.4	22.2
9	14.21	15.4	15.4	15.4	15.4	16.4	20.7	27.0
10	15.41	16.6	16.6	16.6	16.6	19.1	24.3	32.9
11	16.60	17.8	17.8	17.8	17.8	22.0	28.5	40.0
12	17.78	19.0	19.0	19.0	19.7	25.2	33.2	48.7
13	18.96	20.1	20.1	20.1	22.2	28.6	38.7	59.6
14	20.13	21.3	21.3	21.3	24.9	32.4	45.1	73.3
15	21.29	22.5	22.5	22.5	27.8	36.5	52.5	90.4
16	22.45	23.6	23.6	23.6	30.8	41.1	61.3	112
17	23.61	24.8	24.8	26.0	34.0	46.3	71.7	140
18	24.76	25.9	25.9	28.5	37.4	52.0	84.0	175
19	25.90	27.0	27.0	31.0	41.1	58.5	98.9	221
20	27.04	28.2	28.2	33.7	45.1	65.9	117	280
22	29.32	30.5	30.5	39.5	54.1	83.7	164	452
24	31.58	32.7	34.0	45.8	64.6	107	233	740
26	33.84	35.0	38.8	52.7	77.2	137	334	1220
28	36.08	37.2	44.0	60.5	92.5	178	485	2040
30	38.31	39.4	49.4	69.3	111	232	711	3420
35	43.87	46.2	64.8	96.7	178	465	1890	12700
40	49.39	58.2	83.3	135	293	964	5170	47900
45	54.88	71.4	106	191	493	2050	14400	
50	60.34	86.4	135	274	851	4430	40500	
60	71.20	123	221	586	2660	21500		
70	81.99	172	369	1320	8640			
80	92.72	241	636	3080	28800			
90	103.4	341	1130	7360				
99	113.0	472	1930	16300				

	r	0.35	0.30	0.25	0.20	0.15	0.10	0.05
c	m	M	M	M	M	M	M	M
0	2.302	3.89	3.89	3.89	3.89	3.89	3.89	5.46
1	3.889	5.32	5.32	5.32	5.59	7.05	10.2	24.0
2	5.322	6.68	6.68	7.79	9.87	14.1	27.3	130
3	6.681	7.99	9.53	12.0	16.7	28.8	81.4	786
4	7.993	10.8	13.4	18.1	28.5	62.6	263	4960
5	9.274	14.3	18.6	27.2	50.5	144	883	31900
6	10.53	18.5	25.5	41.7	92.5	341	3030	207000
7	11.77	23.8	35.2	65.2	174	830	10500	
8	12.99	30.5	49.2	104	337	2050	37000	
9	14.21	39.3	69.5	170	659	5100	131000	
10	15.41	50.8	99.7	280	1310	12800		
11	16.60	66.3	145	469	2610	32200		
12	17.78	87.2	212	791	5230	81900		
13	18.96	116	314	1340	10500			
14	20.13	154	470	2300	21300			
15	21.29	208	705	3940	43300			
16	22.45	281	1060	6780	88100			
17	23.61	384	1620	11700				
18	24.76	525	2460	20200				
19	25.90	721	3750	35100				
20	27.04	996	5740	61200				
22	29.32	1910	13500					
24	31.58	3700	31900					
26	33.84	7210	76700					
28	36.08	14100						
30	38.31	27700						

<u>Single sampling tables with risk of 50 % for lots of indifference quality and minimum costs.</u>

The tables on pp. 40 - 44 are based on a hypergeometric risk of 50 % for lots of indifference quality, i.e. $P(p_o) = 0.50$, a binomial producers risk, $Q(p_1) = 1 - P(p_1)$, and minimum producers costs.

$$K(p_1) = nk_s(p_1) + (N-n)(k_a(p_1)P(p_1) + k_r(p_1)Q(p_1))$$
$$= (k_s(p_1) - k_a(p_1))(n + (N-n)\gamma_1 Q(p_1) + N\delta_1)$$

where

$$\gamma_1 = \frac{k_r(p_1) - k_a(p_1)}{k_s(p_1) - k_a(p_1)} \quad \text{and} \quad \delta_1 = \frac{k_a(p_1)}{k_s(p_1) - k_a(p_1)}$$

The tables give corresponding values of N, n, c, and $100P(p_1)$, (if $100P(p_1) > 99.95$ it has been recorded as 100) for $\gamma_1 = 1$ and for the following 45 combinations of $100p_o$ and $100p_1$:

$100p_o$	$100p_1$				
0.5	0.1	0.15	0.2	0.25	0.3
1	0.2	0.3	0.4	0.5	0.6
2	0.4	0.6	0.8	1.0	1.2
3	0.6	0.9	1.2	1.5	1.8
4	1.2	1.6	2.0	2.4	2.8
5	1.5	2.0	2.5	3.0	3.5
7	2.8	3.5	4.2	4.9	5.6
10	4.0	5.0	6.0	7.0	8.0
15	6.0	7.5	9.0	10.5	12.0

Methods of interpolation have been discussed in section 5.

The tables may be used for $\gamma_1 \neq 1$ by computing $N^* = N\gamma_1$ and using the plan for N^* and $\gamma_1 = 1$.

The tables on pp.45-46 is based on the same assumption with the only modification that the risks have been computed from the Poisson distribution. For $c \leq 99$ $m = np_o$ and $M = Np_o$ have been tabulated for $M < 50.000$ as function of c and $r = p_1/p_o$ for $r = 0.10, 0.15, \ldots, 0.80$, and for $\gamma_1 = 1$. The optimum plan is (c,m) for $M(c-1) < M < M(c)$.

For $\gamma_1 \neq 1$ use $M(c,\gamma_1) = M(c,1)/\gamma_1$.

The table may also be used to find approximations to the plans defined above since $N = M/p_o$ and $n_h = m_h/p_o$,

where

$$m_h = (m - \frac{p_o}{3})(1 - \frac{1}{3M}(1 - \frac{p_o}{2})) ,$$

n_h indicating the approximation to the "hypergeometric solution".

The table on p. 47 is also based on the Poisson distribution but minimizes the consumers costs

$$K(p_2) = nk_s(p_2) + (N-n)(k_a(p_2)P(p_2) + k_r(p_2)Q(p_2))$$
$$= (k_s(p_2) - k_r(p_2))(n + (N-n)\gamma_2 P(p_2) + N\delta_2)$$

where

$$\gamma_2 = \frac{k_a(p_2) - k_r(p_2)}{k_s(p_2) - k_r(p_2)} \quad \text{and} \quad \delta_2 = \frac{k_r(p_2)}{k_s(p_2) - k_r(p_2)}$$

The solution is given as a function of $r = p_2/p_o$ for $r = 1.50, 1.60, 1.80, 2.00, 2.25, 2.50, 2.75, 3.0, 3.5, 4.0, 5.0, 6.5, 10.0$, and for $\gamma_2 = 1$. It may be used in a similar way as the table discussed above.

Notice that underlining of a sampling plan means that total inspection is cheaper than sampling inspection but that the plan tabulated is the cheapest sampling plan available.

Single Sampling Tables for IQL = 0.5 % and γ = 1.

$100p_1$	0.10			0.15			0.20			0.25			0.30		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	All	-	-	All	-	-	All	-	-	All	-	-	All	-	-
50	47	0	95.4	47	0	93.2	47	0	91.0	47	0	88.9	47	0	86.8
70	61	0	94.1	61	0	91.2	61	0	88.5	61	0	85.8	61	0	83.3
100	75	0	92.8	75	0	89.4	75	0	86.1	75	0	82.9	75	0	79.8
200	100	0	90.5	100	0	86.1	100	0	81.9	100	0	77.9	100	0	74.0
300	111	0	89.5	111	0	84.7	111	0	80.1	111	0	75.7	111	0	71.6
500	121	0	88.6	121	0	83.4	121	0	78.5	121	0	73.9	121	0	69.5
700	126	0	88.2	126	0	82.8	126	0	77.7	126	0	73.0	126	0	68.5
1000	129	0	87.9	129	0	82.4	129	0	77.2	129	0	72.4	129	0	67.9
2000	134	0	87.5	324	1	91.4	324	1	86.2	324	1	80.5	324	1	74.6
3000	328	1	95.7	328	1	91.2	328	1	85.9	328	1	80.2	328	1	74.2
5000	331	1	95.6	527	2	95.4	527	2	91.0	527	2	85.3	724	3	82.5
7000	332	1	95.6	529	2	95.4	727	3	94.0	727	3	88.9	925	4	85.2
10000	531	2	98.3	729	3	97.5	729	3	94.0	928	4	91.4	1126	5	87.4
20000	732	3	99.3	931	4	98.6	1130	5	97.2	1528	7	95.9	1927	9	93.1
30000	732	3	99.3	932	4	98.6	1331	6	98.1	1730	8	96.7	2328	11	94.8
50000	733	3	99.3	1132	5	99.2	1531	7	98.7	2330	11	98.4	3129	15	97.0
70000	933	4	99.7	1332	6	99.6	1732	8	99.1	2531	12	98.7	3530	17	97.7
100000	933	4	99.7	1333	6	99.6	1932	9	99.4	2931	14	99.2	4130	20	98.4
200000	1133	5	99.9	1733	8	99.9	2333	11	99.7	3532	17	99.6	5131	25	99.2

Single Sampling Tables for IQL = 1 % and γ = 1.

$100p_1$	0.2			0.3			0.4			0.5			0.6		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	27	0	94.7	27	0	92.2	27	0	89.7	27	0	87.3	27	0	85.0
50	38	0	92.7	38	0	89.2	38	0	85.9	38	0	82.7	38	0	79.6
70	44	0	91.6	44	0	87.6	44	0	83.8	44	0	80.2	44	0	76.7
100	50	0	90.5	50	0	86.1	50	0	81.8	50	0	77.8	50	0	74.0
200	58	0	89.0	58	0	84.0	58	0	79.3	58	0	74.8	58	0	70.5
300	62	0	88.3	62	0	83.0	62	0	78.0	62	0	73.3	62	0	68.9
500	64	0	88.0	64	0	82.5	64	0	77.4	64	0	72.6	64	0	68.0
700	66	0	87.6	66	0	82.0	66	0	76.8	66	0	71.8	66	0	67.2
1000	67	0	87.4	162	1	91.4	162	1	86.2	162	1	80.5	162	1	74.6
2000	165	1	95.6	165	1	91.2	263	2	91.0	263	2	85.4	263	2	78.9
3000	166	1	95.6	264	2	95.4	264	2	90.9	363	3	88.9	363	3	82.4
5000	265	2	98.3	364	3	97.5	364	3	94.0	464	4	91.4	563	5	87.4
7000	266	2	98.3	365	3	97.5	465	4	95.9	664	6	94.8	763	7	90.7
10000	366	3	99.3	465	4	98.6	565	5	97.2	764	7	95.9	963	9	93.1
20000	366	3	99.3	566	5	99.2	765	7	98.7	1065	10	98.0	1364	13	96.1
30000	466	4	99.7	666	6	99.6	866	8	99.1	1165	11	98.4	1665	16	97.4
50000	466	4	99.7	666	6	99.6	966	9	99.4	1466	14	99.2	2065	20	98.4
70000	566	5	99.9	766	7	99.7	1066	10	99.6	1566	15	99.3	2265	22	98.8
100000	566	5	99.9	866	8	99.9	1166	11	99.7	1766	17	99.6	2566	25	99.2
200000	667	6	100	966	9	99.9	1366	13	99.8	2066	20	99.8	3166	31	99.6

Single Sampling Tables for IQL = 2 % and γ = 1.

$100p_1$	0.4			0.6			0.8			1.0			1.2		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	21	0	91.9	21	0	88.1	21	0	84.5	21	0	81.0	21	0	77.6
50	25	0	90.5	25	0	86.0	25	0	81.8	25	0	77.8	25	0	73.9
70	27	0	89.7	27	0	85.0	27	0	80.5	27	0	76.2	27	0	72.2
100	29	0	89.0	29	0	84.0	29	0	79.2	29	0	74.7	29	0	70.5
200	32	0	88.0	32	0	82.5	32	0	77.3	32	0	72.5	32	0	68.0
300	32	0	88.0	32	0	82.5	32	0	77.3	32	0	72.5	32	0	68.0
500	33	0	87.6	81	1	91.4	81	1	86.3	81	1	80.6	81	1	74.6
700	82	1	95.7	82	1	91.3	82	1	86.0	82	1	80.2	82	1	74.2
1000	82	1	95.7	82	1	91.3	131	2	91.1	131	2	85.6	131	2	79.1
2000	132	2	98.4	132	2	95.4	182	3	94.1	231	4	91.6	231	4	85.3
3000	133	2	98.3	182	3	97.5	232	4	96.0	282	5	93.4	331	6	89.3
5000	133	2	98.3	232	4	98.6	282	5	97.3	382	7	96.0	482	9	93.1
7000	183	3	99.3	233	4	98.6	332	6	98.1	432	8	96.8	582	11	94.8
10000	183	3	99.3	283	5	99.2	383	7	98.7	532	10	98.0	682	13	96.1
20000	233	4	99.7	333	6	99.6	483	9	99.4	683	13	99.0	932	18	98.0
30000	233	4	99.7	383	7	99.8	533	10	99.6	733	14	99.2	1082	21	98.7
50000	283	5	99.9	433	8	99.9	583	11	99.7	883	17	99.6	1283	25	99.2
70000	283	5	99.9	433	8	99.9	633	12	99.8	933	18	99.7	1433	28	99.4
100000	333	6	100	483	9	99.9	683	13	99.8	1033	20	99.8	1533	30	99.6
200000	383	7	100	533	10	100	783	15	99.9	1183	23	99.9	1833	36	99.8

Single Sampling Tables for IQL = 3 % and γ = 1.

$100p_1$	0.6			0.9			1.2			1.5			1.8		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	16	0	90.8	16	0	86.5	16	0	82.4	16	0	78.5	16	0	74.8
50	18	0	89.7	18	0	85.0	18	0	80.5	18	0	76.2	18	0	72.1
70	20	0	88.7	20	0	83.5	20	0	78.5	20	0	73.9	20	0	69.5
100	20	0	88.7	20	0	83.5	20	0	78.5	20	0	73.9	20	0	69.5
200	22	0	87.6	22	0	82.0	22	0	76.7	22	0	71.7	22	0	67.1
300	22	0	87.6	22	0	82.0	22	0	76.7	22	0	71.7	22	0	67.1
500	54	1	95.8	54	1	91.5	54	1	86.3	54	1	80.6	54	1	74.6
700	55	1	95.7	55	1	91.2	87	2	91.3	87	2	85.7	87	2	79.3
1000	55	1	95.7	88	2	95.4	88	2	91.0	121	3	89.0	121	3	82.5
2000	88	2	98.4	121	3	97.6	155	4	96.0	188	5	93.5	221	6	89.4
3000	88	2	98.4	122	3	97.5	188	5	97.3	221	6	94.9	288	8	92.1
5000	122	3	99.4	155	4	98.6	222	6	98.1	288	8	96.9	388	11	94.9
7000	122	3	99.4	188	5	99.2	255	7	98.7	355	10	98.0	488	14	96.6
10000	155	4	99.7	188	5	99.2	288	8	99.1	388	11	98.4	555	16	97.4
20000	155	4	99.7	255	7	99.8	355	10	99.6	488	14	99.2	722	21	98.7
30000	189	5	99.9	255	7	99.8	388	11	99.7	555	16	99.5	822	24	99.1
50000	189	5	99.9	289	8	99.9	422	12	99.8	622	18	99.7	955	28	99.5
70000	222	6	100	322	9	99.9	455	13	99.9	688	20	99.8	1055	31	99.6
100000	222	6	100	355	10	100	489	14	99.9	722	21	99.8	1122	33	99.7
200000	255	7	100	389	11	100	555	16	99.9	855	25	99.9	1322	39	99.9

Single Sampling Tables for IQL = 4 % and γ = 1.

$100p_1$	1.2			1.6			2.0			2.4			2.8		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	13	0	85.5	13	0	81.1	13	0	76.9	13	0	72.9	13	0	69.1
50	14	0	84.4	14	0	79.8	14	0	75.4	14	0	71.2	14	0	67.2
70	15	0	83.4	15	0	78.5	15	0	73.9	15	0	69.5	15	0	65.3
100	16	0	82.4	16	0	77.3	16	0	72.4	16	0	67.8	16	0	63.5
200	16	0	82.4	16	0	77.3	16	0	72.4	16	0	67.8	16	0	63.5
300	41	1	91.3	41	1	86.0	41	1	80.2	41	1	74.2	41	1	68.1
500	41	1	91.3	65	2	91.4	65	2	85.9	65	2	79.5	65	2	72.6
700	66	2	95.5	66	2	91.1	90	3	89.3	90	3	82.9	90	3	75.5
1000	66	2	95.5	91	3	94.1	116	4	91.6	116	4	85.2	116	4	77.4
2000	91	3	97.6	116	4	96.1	166	6	95.0	216	8	92.2	240	9	86.1
3000	116	4	98.7	141	5	97.3	191	7	96.1	266	10	94.2	340	13	90.0
5000	141	5	99.3	191	7	98.8	241	9	97.6	341	13	96.2	466	18	93.1
7000	141	5	99.3	216	8	99.1	291	11	98.5	416	16	97.5	566	22	94.9
10000	166	6	99.6	241	9	99.4	316	12	98.8	466	18	98.1	691	27	96.4
20000	191	7	99.8	266	10	99.6	391	15	99.4	591	23	99.0	916	36	98.1
30000	216	8	99.9	316	12	99.8	441	17	99.6	666	26	99.3	1066	42	98.7
50000	241	9	99.9	341	13	99.9	516	20	99.8	766	30	99.6	1241	49	99.2
70000	241	9	99.9	366	14	99.9	541	21	99.8	841	33	99.7	1366	54	99.4
100000	266	10	100	391	15	99.9	591	23	99.9	916	36	99.8	1516	60	99.6
200000	291	11	100	441	17	100	666	26	99.9	1041	41	99.9	1766	70	99.8

Single Sampling Tables for IQL = 5 % and γ = 1.

$100p_1$	1.5			2.0			2.5			3.0			3.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	11	0	84.7	11	0	80.1	11	0	75.7	11	0	71.5	11	0	67.6
50	12	0	83.4	12	0	78.5	12	0	73.8	12	0	69.4	12	0	65.2
70	12	0	83.4	12	0	78.5	12	0	73.8	12	0	69.4	12	0	65.2
100	13	0	82.2	13	0	76.9	13	0	72.0	13	0	67.3	13	0	62.9
200	32	1	91.7	32	1	86.6	32	1	81.0	32	1	75.1	32	1	67.9
300	33	1	91.2	33	1	85.9	33	1	80.1	33	1	74.0	33	1	67.8
500	52	2	95.7	52	2	91.4	52	2	85.9	72	3	83.0	52	2	72.6
700	53	2	95.5	72	3	94.4	72	3	89.4	92	4	85.7	92	4	78.0
1000	73	3	97.6	73	3	94.1	93	4	91.6	112	5	87.9	132	6	81.9
2000	93	4	98.7	113	5	97.4	153	7	96.1	192	9	93.5	232	11	88.3
3000	93	4	98.7	133	6	98.2	173	8	96.9	233	11	95.0	312	15	91.5
5000	113	5	99.3	153	7	98.8	213	10	98.1	313	15	97.1	432	21	94.6
7000	133	6	99.6	173	8	99.2	253	12	98.8	353	17	97.8	513	25	95.9
10000	133	6	99.6	193	9	99.4	273	13	99.0	413	20	98.6	613	30	97.2
20000	173	8	99.9	233	11	99.7	333	16	99.5	513	25	99.3	793	39	98.5
30000	173	8	99.9	253	12	99.8	373	18	99.7	573	28	99.5	913	45	99.0
50000	193	9	99.9	293	14	99.9	413	20	99.8	653	32	99.7	1053	52	99.4
70000	213	10	100	313	15	99.9	453	22	99.9	693	34	99.8	1153	57	99.5
100000	213	10	100	333	16	100	493	24	99.9	753	37	99.8	1273	63	99.7
200000	253	12	100	353	17	100	553	27	100	873	43	99.9	1473	73	99.8

Single Sampling Tables for IQL = 7 % and γ = 1.

$100p_1$	2.8			3.5			4.2			4.9			5.6		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	8	0	79.7	8	0	75.2	8	0	70.9	8	0	66.9	8	0	63.1
50	9	0	77.4	9	0	72.6	9	0	68.0	9	0	63.6	9	0	59.5
70	9	0	77.4	9	0	72.6	9	0	68.0	9	0	63.6	9	0	59.5
100	9	0	77.4	9	0	72.6	9	0	68.0	9	0	63.6	9	0	59.5
200	23	1	86.5	23	1	80.8	23	1	74.9	23	1	68.8	23	1	62.5
300	37	2	91.6	37	2	86.1	37	2	79.8	37	2	72.8	37	2	65.1
500	52	3	94.2	52	3	89.2	66	4	85.6	66	4	77.8	66	4	69.3
700	52	3	94.2	66	4	91.9	80	5	88.0	94	6	82.2	94	6	72.7
1000	66	4	96.2	80	5	93.8	109	7	91.1	123	8	85.0	123	8	74.8
2000	95	6	98.2	123	8	97.1	166	11	95.2	209	14	90.9	252	17	82.5
3000	109	7	98.8	152	10	98.2	195	13	96.3	280	19	93.9	366	25	87.1
5000	123	8	99.2	180	12	98.9	252	17	97.9	366	25	96.1	523	36	91.2
7000	138	9	99.4	195	13	99.1	280	19	98.4	423	29	97.1	652	45	93.3
10000	152	10	99.6	223	15	99.4	323	22	99.0	495	34	97.9	795	55	95.1
20000	181	12	99.8	266	18	99.7	395	27	99.5	623	43	98.9	1109	77	97.5
30000	195	13	99.9	281	19	99.8	438	30	99.6	709	49	99.3	1295	90	98.3
50000	209	14	99.9	323	22	99.9	495	34	99.8	823	57	99.6			
70000	223	15	99.9	338	23	99.9	523	36	99.8	895	62	99.7			
100000	238	16	100	366	25	99.9	566	39	99.9	966	67	99.8			
200000	266	18	100	409	28	100	652	45	99.9	1109	77	99.9			

Single Sampling Tables for IQL = 10 % and $\gamma = 1$.

$100p_1$	4.0			5.0			6.0			7.0			8.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	6	0	78.3	6	0	73.5	6	0	69.0	6	0	64.7	6	0	60.6
50	6	0	78.3	6	0	73.5	6	0	69.0	6	0	64.7	6	0	60.6
70	6	0	78.3	6	0	73.5	6	0	69.0	6	0	64.7	6	0	60.6
100	16	1	86.7	16	1	81.1	16	1	75.1	16	1	88.7	16	1	82.0
200	26	2	91.6	26	2	86.1	26	2	79.7	26	2	72.7	26	2	65.2
300	26	2	91.6	36	3	89.6	36	3	83.2	36	3	75.7	36	3	67.3
500	36	3	94.5	46	4	92.1	56	5	88.2	66	6	82.2	66	6	75.9
700	46	4	96.4	56	5	94.0	76	7	91.5	86	8	85.3	86	8	75.1
1000	56	5	97.6	76	7	96.4	96	9	93.8	116	11	88.7	126	12	79.2
2000	76	7	98.9	96	9	97.8	136	13	96.6	186	18	93.7	246	24	87.0
3000	86	8	99.2	116	11	98.6	166	16	97.8	236	23	95.7	326	32	90.2
5000	96	9	99.5	136	13	99.2	196	19	98.5	296	29	97.3	456	45	93.7
7000	106	10	99.6	146	14	99.3	216	21	98.9	336	33	97.9	556	55	95.4
10000	116	11	99.8	166	16	99.6	246	24	99.3	386	38	98.6	656	65	96.6
20000	136	13	99.9	196	19	99.8	296	29	99.6	486	48	99.3	876	87	98.3
30000	146	14	99.9	216	21	99.9	326	32	99.7	536	53	99.5			
50000	156	15	99.9	236	23	99.9	366	36	99.8	616	61	99.7			
70000	166	16	100	246	24	99.9	386	38	99.9	666	66	99.8			
100000	176	17	100	266	26	100	416	41	99.9	716	71	99.9			
200000	196	19	100	296	29	100	476	47	100	816	81	99.9			

Single Sampling Tables for IQL = 15 % and $\gamma = 1$.

$100p_1$	6.0			7.5			9.0			10.5			12.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	4	0	78.1	4	0	73.2	4	0	68.6	4	0	64.2	4	0	60.0
50	4	0	78.1	4	0	73.2	4	0	68.6	4	0	64.2	4	0	60.0
70	11	1	86.2	11	1	80.3	11	1	74.0	11	1	67.6	11	1	61.0
100	11	1	86.2	11	1	80.3	11	1	74.0	11	1	67.6	11	1	61.0
200	17	2	92.2	24	3	89.9	24	3	83.5	24	3	75.9	24	3	67.1
300	24	3	94.7	31	4	92.1	37	5	88.9	37	5	81.3	37	5	72.0
500	31	4	96.4	37	5	94.4	51	7	91.6	57	8	86.1	64	9	76.6
700	37	5	97.8	51	7	96.5	64	9	94.1	77	11	89.4	91	13	80.1
1000	44	6	98.5	57	8	97.5	77	11	95.8	104	15	92.3	124	18	84.2
2000	51	7	98.9	77	11	98.8	104	15	97.6	151	22	95.6	217	32	90.8
3000	57	8	99.3	84	12	99.0	124	18	98.5	184	27	97.1	284	42	93.4
5000	71	10	99.7	97	14	99.4	144	21	99.0	224	33	98.2	371	55	95.7
7000	77	11	99.8	111	16	99.6	164	24	99.3	257	38	98.8	437	65	97.0
10000	84	12	99.9	117	17	99.7	177	26	99.5	284	42	99.1	511	76	97.8
20000	91	13	99.9	137	20	99.9	211	31	99.7	351	52	99.5	651	97	98.9
30000	97	14	99.9	151	22	99.9	231	34	99.8	384	57	99.7			
50000	111	16	100	164	24	99.9	257	38	99.9	431	64	99.8			
70000	117	17	100	171	25	100	271	40	99.9	464	69	99.9			
100000	124	18	100	184	27	100	291	43	100	497	74	99.9			
200000	137	20	100	204	30	100	324	48	100	564	84	100			

Single Sampling Tables with Risk of 50 % for Lots of Indifference Quality

$B(c,m) = 0.50$, $r = p_1/p_0$, $m = np_0$, $M = Np_0$, $\gamma = 1$.

	r	0.80	0.75	0.70	0.65	0.60	0.55	0.50	0.45
c	m	M	M	M	M	M	M	M	M
0	0.6930	16.8	14.2	12.5	11.3	10.5	10.0	9.65	9.46
1	1.678	25.0	21.6	19.5	18.3	17.5	17.3	17.4	17.9
2	2.674	32.5	28.7	26.5	25.4	25.1	25.4	26.6	28.7
3	3.672	39.6	35.6	33.6	32.9	33.3	34.9	37.9	42.9
4	4.671	46.4	42.4	40.8	40.8	42.4	45.9	51.8	61.5
5	5.670	53.5	49.6	48.4	49.5	52.8	58.9	69.1	86.3
6	6.669	60.3	56.7	56.4	58.8	64.4	74.1	90.6	119
7	7.669	67.5	64.3	65.0	69.1	77.6	92.2	117	163
8	8.669	74.1	71.7	73.7	80.0	92.1	113	150	220
9	9.668	81.5	79.8	83.3	92.3	109	139	192	296
10	10.67	88.7	88.0	93.3	106	128	168	243	396
11	11.67	95.6	96.1	104	120	149	203	307	527
12	12.67	103	105	115	136	174	245	386	702
13	13.67	111	114	127	153	201	294	485	932
14	14.67	119	124	140	172	232	351	607	1230
15	15.67	126	134	154	193	268	419	758	1630
16	16.67	135	144	168	215	308	500	946	2150
17	17.67	143	154	183	240	353	595	1180	2830
18	18.67	151	166	200	268	405	707	1470	3720
19	19.67	159	177	217	297	462	838	1820	4890
20	20.67	168	189	236	330	529	995	2260	6420
22	22.67	187	215	277	405	689	1390	3470	11000
24	24.67	206	243	323	496	893	1950	5320	18900
26	26.67	226	273	376	604	1160	2720	8120	32300
28	28.67	247	306	437	733	1490	3770	12400	55000
30	30.67	269	341	505	889	1920	5240	18800	
35	35.67	329	445	720	1430	3580	11800	53100	
40	40.67	397	574	1020	2270	6630	26300		
45	45.67	475	733	1420	3590	12200	58400		
50	50.67	563	930	1980	5640	22300			
60	60.67	778	1470	3790	13800				
70	70.67	1060	2300	7180	33100				
80	80.67	1420	3570	13500					
90	90.67	1890	5490	25100					
99	99.67	2440	8060	43900					

c	r m	0.40 M	0.35 M	0.30 M	0.25 M	0.20 M	0.15 M	0.10 M
0	0.6930	9.45	9.60	9.98	10.7	11.9	14.0	18.6
1	1.678	18.9	20.6	23.4	28.1	36.6	54.0	101
2	2.674	32.2	37.8	47.1	63.9	98.2	183	490
3	3.672	51.0	64.6	88.9	137	250	594	2270
4	4.671	77.8	107	162	286	621	1880	10300
5	5.670	116	173	292	587	1520	5830	45600
6	6.669	171	276	518	1190	3670	17900	200000
7	7.669	250	438	912	2400	8800	54400	
8	8.669	361	688	1590	4790	20900		
9	9.668	520	1080	2770	9530	49500		
10	10.67	745	1680	4810	18900	116000		
11	11.67	1060	2610	8290	37100			
12	12.67	1520	4050	14300	73000			
13	13.67	2150	6260	24500				
14	14.67	3050	9660	41900				
15	15.67	4320	14900	71700				
16	16.67	6100	22800					
17	17.67	8600	35000					
18	18.67	12100	53600					
19	19.67	17000						
20	20.67	24000						
22	22.67	47100						

Single Sampling Tables with Risk of 50% for Lots of Indifference Quality

$B(c,m) = 0.50$, $r = p_2/p_0$, $m = np_0$, $M = Np_0$, $\gamma = 1.$

	r	1.50	1.60	1.80	2.00	2.25	2.50	2.75	3.0	3.5	4.0	5.0
c	m	M	M	M	M	M	M	M	M	M	M	M
0	0.6930	10.8	10.1	9.38	9.20	9.39	9.90	10.7	11.7	14.7	19.1	34.4
1	1.678	17.8	17.2	17.3	18.4	21.1	25.2	31.3	39.8	69.3	129	508
2	2.674	25.0	25.0	27.0	31.2	40.0	54.7	78.5	117	289	778	6700
3	3.672	32.8	33.8	39.1	49.0	71.1	112	187	329	1150	4470	84000
4	4.671	41.3	43.9	54.5	74.4	122	221	432	897	4440	25000	
5	5.670	50.6	55.4	73.8	110	206	430	983	2410	16900	137000	
6	6.669	60.9	68.8	98.5	161	342	828	2210	6380	63300		
7	7.669	72.2	84.0	130	232	564	1580	4930	16800			
8	8.669	85.0	102	170	333	924	3000	10900	43800			
9	9.668	98.8	122	220	474	1500	5650	24100	113000			
10	10.67	114	146	285	673	2440	10600	52800				
11	11.67	132	174	367	953	3950	19900					
12	12.67	151	206	469	1340	6370	37000					
13	13.67	172	243	600	1890	10200	68800					
14	14.67	196	285	766	2660	16400						
15	15.67	222	335	976	3720	26300						
16	16.67	252	392	1240	5210	42100						
17	17.67	285	459	1580	7280	67100						
18	18.67	321	536	2000	10200							
19	19.67	362	626	2540	14200							
20	20.67	407	727	3200	19700							
22	22.67	512	984	5120	38000							
24	24.67	644	1330	8140								
26	26.67	806	1780	12900								
28	28.67	1010	2390	20500								
30	30.67	1250	3200	32300								
35	35.67	2150	6580									
40	40.67	3670	13400									
45	45.67	6220	27200									
50	50.67	10500	54800									
60	60.67	29500										

	r	6.5	10.0
c	m	M	M
0	0.6930	91.6	1010
1	1.678	4680	1090000
2	2.674	213000	

Single sampling tables with producers risk of 5 % and minimum consumers costs.

The tables on pp. 50 - 59 are based on a hypergeometric producers risk of 5 %, i.e. $P(p_1) = 0.95$, a binomial consumers risk, $P(p_2)$, and minimum consumers costs

$$K(p_2) = nk_s(p_2) + (N-n)(k_a(p_2)P(p_2) + k_r(p_2)Q(p_2))$$
$$= (k_s(p_2) - k_r(p_2))(n + (N-n)\gamma_2 P(p_2) + N\delta_2)$$

where

$$\gamma_2 = \frac{k_a(p_2) - k_r(p_2)}{k_s(p_2) - k_r(p_2)} \quad \text{and} \quad \delta_2 = \frac{k_r(p_2)}{k_s(p_2) - k_r(p_2)}$$

The tables give corresponding values of N, n, c, and $100P(p_2)$ for $\gamma_2 = 2$ and 10, and for the following 50 combinations of $100p_1$ and $100p_2$:

$100p_1$	$100p_2$				
0.1	0.2	0.3	0.4	0.6	1.0
0.2	0.4	0.6	0.8	1.2	2.0
0.5	1.0	1.5	2.0	3.0	5.0
1.0	2.0	2.5	3.0	4.0	6.0
2.0	4.0	5.0	6.0	8.0	12.0
3.0	5.0	6.0	7.5	9.0	12.0
4.0	6.0	7.0	8.0	10.0	12.0
5.0	7.5	8.5	10.0	12.5	15.0
7.0	10.5	12.0	14.0	17.5	21.0
10.0	15.0	17.0	20.0	25.0	30.0

Methods of interpolation have been discussed in sections 5 and 7.

The tables may be used for $\gamma_2 \neq 2$ and $\gamma_2 \neq 10$ in the following way: For $\gamma_2 < 5$ compute $N^* = N\gamma_2/2$ and use the plan for N^* and $\gamma_2 = 2$.

For $5 \leq \gamma_2 \leq 20$ compute $N^* = N\gamma_2/10$ and use the plan for N^* and $\gamma_2 = 10$.

The tables on pp. 60 - 61 are based on the same assumptions with the only modification that the consumers and the producers risk have been computed from the Poisson distribution. For $c \leq 99$ $m = np_1$ and $M = Np_1$ have been tabulated for $M < 50.000$ as function of c and $r = p_2/p_1$ for $r = 1.50, 1.60, 1.80, 2.00, 2.25, 2.50, 2.75, 3.0, 3.5, 4.0, 5.0, 6.5, 10.0,$ and for $\gamma_2 = 2$ and 10. The optimum plan is (c,m) for $M(c-1) < M < M(c)$.

The tables may be used for $\gamma_2 \neq 2$ and $\gamma_2 \neq 10$ in the following way: For $\gamma_2 < 5$ $M(c,\gamma_2) = M(c,2)\ 2/\gamma_2$ and for $5 \leq \gamma_2 \leq 20$ $M(c,\gamma_2) = M(c,10)10/\gamma_2$.

The tables may also be used to find approximations to the plans defined above since $N = M/p_1$ and $n_h = m_h/p_1$,

where

$$m_h = \left\{m - \frac{m-c}{2}p_1\right\}\left\{1 - \frac{m-c}{2(M-0.6c)}\left(1 - \frac{p_1}{2}\right)\frac{m + c + \frac{1}{M-c+0.2}}{m + c + 1}\right\}$$

n_h indicating the approximation to the "hypergeometric solution".

Notice that <u>underlining</u> of a sampling plan means that <u>total inspection is cheaper than sampling inspection</u> but that the plan tabulated is the cheapest sampling plan available.

Single Sampling Tables for AQL = 0.1 % and γ = 2.

$100p_2$	1.0			0.6			0.4			0.3			0.2		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	25	0	77.8	25	0	86.0	25	0	90.5	25	0	92.8	25	0	95.1
50	32	0	72.5	32	0	82.5	32	0	88.0	32	0	90.8	32	0	93.8
70	37	0	68.9	37	0	80.0	37	0	86.2	37	0	89.5	37	0	92.9
100	40	0	66.9	40	0	78.6	40	0	85.2	40	0	88.7	40	0	92.3
200	45	0	63.6	45	0	76.3	45	0	83.5	45	0	87.4	45	0	91.4
300	47	0	62.4	47	0	75.4	47	0	82.8	47	0	86.8	47	0	91.0
500	49	0	61.1	49	0	74.5	49	0	82.2	49	0	86.3	49	0	90.7
700	49	0	61.1	49	0	74.5	49	0	82.2	49	0	86.3	49	0	90.7
1000	50	0	60.5	50	0	74.0	50	0	81.8	50	0	86.1	50	0	90.5
2000	448	1	6.1	448	1	25.0	448	1	46.5	448	1	61.1	448	1	77.4
3000	406	1	8.6	1106	2	3.9	1106	2	18.2	1106	2	35.5	1106	2	61.9
5000	947	2	0.4	947	2	7.7	1714	3	8.9	2747	4	8.6	2747	4	35.8
7000	902	2	0.6	1578	3	1.5	2390	4	3.8	3356	5	6.4	4564	6	19.5
10000	873	2	0.8	1501	3	2.1	2225	4	5.8	3935	6	5.1	6060	8	14.7
20000	844	2	0.9	2083	4	0.5	2792	5	3.4	4343	7	5.3	8841	12	10.4
30000	835	2	1.0	2043	4	0.6	3451	6	1.6	5801	9	2.1	11101	15	7.1
50000	1390	3	0.0	2013	4	0.7	4111	7	0.8	6430	10	1.6	13256	18	5.3
70000	1383	3	0.1	2660	5	0.1	4072	7	0.8	7142	11	1.0	15634	21	3.4
100000	1378	3	0.1	2646	5	0.1	4777	8	0.4	7866	12	0.7	18019	24	2.2
200000	1373	3	0.1	2630	5	0.2	5477	9	0.2	8565	13	0.4	21146	28	1.3

Single Sampling Tables for AQL = 0.2 % and γ = 2.

$100p_2$	2.0			1.2			0.8			0.6			0.4		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	18	0	69.5	18	0	80.5	18	0	86.5	18	0	89.7	18	0	93.0
50	20	0	66.8	20	0	78.5	20	0	85.2	20	0	88.7	20	0	92.3
70	22	0	64.1	22	0	76.7	22	0	83.8	22	0	87.6	22	0	91.6
100	23	0	62.8	23	0	75.8	23	0	83.1	23	0	87.1	23	0	91.2
200	24	0	61.6	24	0	74.8	24	0	82.5	24	0	86.6	24	0	90.8
300	25	0	60.3	25	0	73.9	25	0	81.8	25	0	86.0	25	0	90.5
500	25	0	60.3	25	0	73.9	25	0	81.8	25	0	86.0	25	0	90.5
700	270	1	2.8	270	1	16.4	270	1	36.3	270	1	51.8	270	1	70.6
1000	224	1	6.0	224	1	24.9	224	1	46.4	224	1	61.1	224	1	77.4
2000	498	2	0.3	498	2	6.2	947	3	5.6	947	3	18.1	947	3	47.6
3000	460	2	0.5	815	3	1.2	815	3	11.0	1256	4	12.9	1822	5	26.5
5000	437	2	0.7	751	3	2.1	1113	4	5.8	1519	5	10.8	3030	8	14.7
7000	428	2	0.8	729	3	2.5	1444	5	2.6	1846	6	7.5	3742	10	12.0
10000	422	2	0.9	1042	4	0.5	1397	5	3.3	2172	7	5.3	4421	12	10.3
20000	699	3	0.0	1012	4	0.7	2074	7	0.7	2849	9	2.5	6295	17	5.6
30000	694	3	0.0	1335	5	0.1	2045	7	0.8	3192	10	1.7	7440	20	3.8
50000	690	3	0.1	1324	5	0.1	2389	8	0.4	3934	12	0.7	9011	24	2.2
70000	688	3	0.1	1319	5	0.1	2378	8	0.4	4305	13	0.4	9786	26	1.7
100000	687	3	0.1	1316	5	0.2	2739	9	0.2	4284	13	0.4	10575	28	1.3
200000	685	3	0.1	1650	6	0.0	3101	10	0.1	5052	15	0.2	12638	33	0.6

Single Sampling Tables for AQL = 0.5 % and γ = 2.

$100p_2$	5.0			3.0			2.0			1.5			1.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	9	0	63.0	9	0	76.0	9	0	83.4	9	0	87.3	9	0	91.4
50	9	0	63.0	9	0	76.0	9	0	83.4	9	0	87.3	9	0	91.4
70	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
100	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
200	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
300	103	1	3.3	103	1	18.2	103	1	38.7	103	1	54.2	103	1	72.5
500	85	1	7.0	251	2	1.9	251	2	12.0	251	2	27.2	251	2	54.1
700	80	1	8.6	208	2	5.0	208	2	21.3	421	3	12.3	421	3	39.2
1000	190	2	0.4	190	2	7.4	343	3	8.7	550	4	8.5	550	4	35.6
2000	175	2	0.7	301	3	1.9	446	4	5.6	608	5	10.7	1213	8	14.5
3000	171	2	0.8	291	3	2.4	574	5	2.7	901	7	4.0	1469	10	13.3
5000	168	2	0.9	412	4	0.5	699	6	1.4	1013	8	3.3	1895	13	9.9
7000	281	3	0.0	407	4	0.6	686	6	1.6	1149	9	2.2	2368	16	6.3
10000	279	3	0.0	403	4	0.7	823	7	0.7	1287	10	1.5	2653	18	5.2
20000	276	3	0.0	530	5	0.1	957	8	0.3	1575	12	0.6	3430	23	2.6
30000	276	3	0.0	528	5	0.1	951	8	0.4	1722	13	0.4	3909	26	1.7
50000	275	3	0.0	526	5	0.1	1095	9	0.1	1870	14	0.3	4563	30	0.9
70000	275	3	0.0	661	6	0.0	1092	9	0.2	1864	14	0.3	4890	32	0.6
100000	275	3	0.0	660	6	0.0	1240	10	0.1	2020	15	0.2	5221	34	0.5
200000	395	4	0.0	659	6	0.0	1390	11	0.0	2175	16	0.1	5895	38	0.2

Single Sampling Tables for AQL = 1 % and γ = 2.

$100p_2$	6.0			4.0			3.0			2.5			2.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
50	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
70	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
100	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
200	45	1	23.9	45	1	45.8	45	1	60.7	45	1	68.9	45	1	77.3
300	111	2	3.4	111	2	17.5	111	2	34.9	111	2	47.3	111	2	61.7
500	95	2	7.1	172	3	8.4	276	4	8.1	276	4	17.9	276	4	35.2
700	159	3	1.2	240	4	3.5	240	4	15.1	337	5	15.2	457	6	19.2
1000	151	3	1.8	223	4	5.4	305	5	10.3	395	6	13.5	607	8	14.3
2000	209	4	0.4	280	5	3.1	436	7	4.9	606	9	6.3	886	12	10.0
3000	205	4	0.5	346	6	1.4	582	9	1.9	750	11	3.7	1112	15	6.8
5000	202	4	0.6	412	7	0.7	645	10	1.4	892	13	2.3	1328	18	5.1
7000	267	5	0.1	409	7	0.7	716	11	0.9	961	14	1.8	1566	21	3.2
10000	266	5	0.1	479	8	0.3	789	12	0.6	1116	16	1.0	1717	23	2.6
20000	264	5	0.1	549	9	0.1	859	13	0.4	1265	18	0.6	2118	28	1.2
30000	264	5	0.1	548	9	0.1	934	14	0.2	1341	19	0.4	2365	31	0.7
50000	331	6	0.0	621	10	0.1	1011	15	0.1	1502	21	0.2	2613	34	0.4
70000	331	6	0.0	621	10	0.1	1090	16	0.1	1582	22	0.2	2780	36	0.3
00000	330	6	0.0	620	10	0.1	1089	16	0.1	1664	23	0.1	2950	38	0.2
00000	400	7	0.0	695	11	0.0	1249	18	0.0	1828	25	0.1	3293	42	0.1

Single Sampling Tables for AQL = 2 % and γ = 2.

$100p_2$	12.0			8.0			6.0			5.0			4.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	2	0	77.4	2	0	84.6	2	0	88.4	2	0	90.2	2	0	92.2
50	2	0	77.4	2	0	84.6	2	0	88.4	2	0	90.2	2	0	92.2
70	27	1	14.8	27	1	35.2	27	1	51.2	27	1	60.6	27	1	70.6
100	23	1	21.9	23	1	44.1	23	1	59.5	23	1	67.9	23	1	76.6
200	50	2	5.1	95	3	4.9	95	3	17.1	95	3	29.5	95	3	47.0
300	47	2	6.8	82	3	9.8	126	4	12.0	183	5	10.1	183	5	25.6
500	76	3	1.5	112	4	4.9	153	5	9.8	198	6	13.0	304	8	14.0
700	74	3	1.8	145	5	2.2	186	6	6.6	275	8	6.5	324	9	16.3
1000	72	3	2.1	141	5	2.7	219	7	4.5	304	9	5.9	444	12	9.6
2000	102	4	0.4	172	6	1.3	286	9	2.1	410	12	2.8	632	17	5.1
3000	101	4	0.5	206	7	0.6	321	10	1.4	443	13	2.3	702	19	4.3
5000	133	5	0.1	240	8	0.3	356	11	0.9	517	15	1.3	860	23	2.4
7000	133	5	0.1	239	8	0.3	393	12	0.6	555	16	1.0	938	25	1.8
10000	133	5	0.1	238	8	0.3	430	13	0.3	634	18	0.5	1061	28	1.1
20000	132	5	0.1	274	9	0.1	467	14	0.2	712	20	0.3	1224	32	0.6
30000	166	6	0.0	311	10	0.0	506	15	0.1	752	21	0.2	1350	35	0.3
50000	166	6	0.0	311	10	0.0	546	16	0.1	833	23	0.1	1433	37	0.2
70000	166	6	0.0	349	11	0.0	586	17	0.0	874	24	0.1	1519	39	0.2
100000	166	6	0.0	349	11	0.0	585	17	0.0	916	25	0.0	1605	41	0.1
200000	201	7	0.0	387	12	0.0	666	19	0.0	957	26	0.0	1779	45	0.0

Single Sampling Tables for AQL = 3 % and γ = 2.

$100p_2$	12.0			9.0			7.5			6.0			5.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	2	0	77.4	2	0	82.8	2	0	85.6	2	0	88.4	2	0	90.2
50	18	1	34.6	18	1	50.9	18	1	60.4	18	1	70.6	18	1	77.4
70	56	2	2.9	56	2	11.0	56	2	19.9	56	2	33.9	56	2	46.5
100	37	2	16.3	37	2	34.1	37	2	46.8	37	2	61.6	37	2	71.8
200	55	3	9.1	85	4	11.0	122	5	9.8	122	5	25.3	122	5	42.5
300	76	4	4.1	105	5	8.1	136	6	10.9	172	7	18.4	216	8	24.4
500	97	5	1.9	123	6	6.7	181	8	6.9	246	10	12.3	320	12	18.6
700	94	5	2.5	145	7	4.5	202	9	5.8	294	12	9.9	396	15	16.0
1000	116	6	1.1	168	8	2.9	251	11	3.3	341	14	8.2	503	19	12.1
2000	138	7	0.5	215	10	1.2	296	13	2.1	469	19	4.1	714	27	7.5
3000	137	7	0.5	238	11	0.8	347	15	1.1	547	22	2.6	849	32	5.4
5000	160	8	0.2	262	12	0.5	370	16	0.9	654	26	1.4	1043	39	3.2
7000	159	8	0.2	288	13	0.3	423	18	0.5	708	28	1.0	1184	44	2.1
10000	184	9	0.1	313	14	0.2	449	19	0.3	762	30	0.7	1296	48	1.6
20000	183	9	0.1	338	15	0.1	502	21	0.2	872	34	0.4	1555	57	0.7
30000	208	10	0.0	365	16	0.1	529	22	0.1	928	36	0.3	1671	61	0.5
50000	208	10	0.0	364	16	0.1	556	23	0.1	1014	39	0.1	1848	67	0.3
70000	233	11	0.0	391	17	0.0	584	24	0.1	1071	41	0.1	1936	70	0.2
[illegible]00000	233	11	0.0	418	18	0.0	611	25	0.0	1129	43	0.1	2056	74	0.1
[illegible]00000	259	12	0.0	445	19	0.0	667	27	0.0	1217	46	0.0	2266	81	0.1

Single Sampling Tables for AQL = 4 % and γ = 2.

$100p_2$	12.0			10.0			8.0			7.0			6.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	16	1	41.2	16	1	51.5	16	1	63.0	16	1	69.0	16	1	75.1
50	12	1	56.9	12	1	65.9	12	1	75.1	12	1	79.7	12	1	84.0
70	29	2	30.7	29	2	43.5	29	2	58.7	29	2	66.8	29	2	74.9
100	48	3	15.7	48	3	28.0	48	3	45.8	48	3	56.4	48	3	67.5
200	81	5	6.6	81	5	16.8	107	6	23.9	139	7	23.6	139	7	40.1
300	96	6	4.9	119	7	8.3	143	8	18.4	170	9	24.2	235	11	24.4
500	110	7	3.9	153	9	5.2	223	12	8.8	248	13	16.9	330	16	22.6
700	127	8	2.6	169	10	4.3	258	14	7.4	331	17	10.7	409	20	20.3
1000	144	9	1.7	206	12	2.4	294	16	6.0	387	20	9.0	536	26	15.1
2000	180	11	0.7	241	14	1.5	391	21	2.9	549	28	4.4	785	38	9.5
3000	178	11	0.7	280	16	0.7	451	24	1.8	629	32	3.1	979	47	6.2
5000	197	12	0.4	298	17	0.6	510	27	1.2	732	37	2.0	1215	58	3.8
7000	216	13	0.3	317	18	0.4	551	29	0.8	816	41	1.3	1367	65	2.7
10000	235	14	0.1	337	19	0.3	592	31	0.6	879	44	1.0	1519	72	1.9
20000	254	15	0.1	377	21	0.1	676	35	0.3	1030	51	0.4	1829	86	0.9
30000	274	16	0.0	397	22	0.1	718	37	0.2	1095	54	0.3	2008	94	0.6
50000	294	17	0.0	439	24	0.0	783	40	0.1	1205	59	0.2			
70000	294	17	0.0	459	25	0.0	826	42	0.1	1249	61	0.1			
100000	314	18	0.0	459	25	0.0	848	43	0.1	1316	64	0.1			
200000	334	19	0.0	501	27	0.0	936	47	0.0	1451	70	0.0			

Single Sampling Tables for AQL = 5 % and γ = 2.

$100p_2$	15.0			12.5			10.0			8.5			7.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	11	1	49.2	11	1	59.2	11	1	69.7	11	1	76.1	11	1	80.3
50	26	2	23.0	26	2	35.2	26	2	51.1	26	2	61.8	26	2	69.1
70	43	3	9.6	43	3	19.8	43	3	36.5	43	3	49.7	43	3	59.5
100	56	4	6.3	56	4	15.5	56	4	32.9	56	4	47.7	56	4	58.8
200	62	5	8.1	80	6	11.4	100	7	20.6	122	8	28.2	149	9	31.3
300	74	6	5.9	109	8	6.2	148	10	11.6	170	11	21.2	218	13	23.7
500	103	8	2.1	137	10	3.7	191	13	8.3	250	16	13.9	314	19	19.5
700	100	8	2.7	150	11	3.0	220	15	6.7	296	19	11.6	397	24	15.7
1000	114	9	1.7	163	12	2.5	268	18	4.0	360	23	8.6	477	29	13.6
2000	143	11	0.6	208	15	1.0	328	22	2.4	508	32	4.0	715	43	7.2
3000	158	12	0.4	223	16	0.7	376	25	1.5	591	37	2.6	851	51	5.1
5000	173	13	0.2	254	18	0.4	425	28	0.9	692	43	1.5	1041	62	3.0
7000	173	13	0.2	270	19	0.3	458	30	0.6	742	46	1.2	1163	69	2.1
10000	188	14	0.1	286	20	0.2	491	32	0.4	810	50	0.8	1286	76	1.5
20000	204	15	0.1	319	22	0.1	558	36	0.2	932	57	0.4	1517	89	0.7
30000	220	16	0.0	335	23	0.1	593	38	0.1	1002	61	0.3	1643	96	0.5
50000	236	17	0.0	351	24	0.0	645	41	0.1	1091	66	0.1			
70000	236	17	0.0	368	25	0.0	662	42	0.1	1145	69	0.1			
00000	252	18	0.0	385	26	0.0	697	44	0.0	1199	72	0.1			
00000	268	19	0.0	402	27	0.0	749	47	0.0	1307	78	0.0			

Single Sampling Tables for AQL = 7 % and γ = 2.

$100p_2$	21.0			17.5			14.0			12.0			10.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	25	2	8.0	25	2	16.1	25	2	30.0	25	2	40.9	25	2	50.4
50	31	3	8.5	31	3	18.4	31	3	35.2	31	3	48.0	31	3	58.7
70	25	3	19.9	41	4	13.3	41	4	30.2	41	4	44.4	41	4	56.6
100	35	4	11.4	49	5	12.0	66	6	16.6	66	6	30.8	66	6	45.2
200	54	6	4.6	66	7	8.9	94	9	13.6	124	11	17.6	142	12	26.1
300	63	7	3.2	87	9	4.7	127	12	8.4	156	14	14.8	187	16	23.1
500	72	8	2.2	108	11	2.5	158	15	5.9	212	19	10.1	269	23	17.3
700	82	9	1.4	117	12	2.1	179	17	4.6	258	23	7.2	342	29	12.7
1000	93	10	0.7	127	13	1.6	213	20	2.8	304	27	5.2	413	35	10.1
2000	102	11	0.5	149	15	0.8	258	24	1.5	385	34	2.9	584	49	5.2
3000	113	12	0.3	171	17	0.4	280	26	1.1	445	39	1.8	682	57	3.6
5000	124	13	0.2	182	18	0.3	316	29	0.6	505	44	1.1	819	68	2.0
7000	124	13	0.2	193	19	0.2	339	31	0.4	555	48	0.7	894	74	1.5
10000	135	14	0.1	205	20	0.1	363	33	0.3	591	51	0.5	983	81	1.0
20000	146	15	0.0	228	22	0.1	412	37	0.1	666	57	0.3	1136	93	0.5
30000	158	16	0.0	240	23	0.0	437	39	0.1	717	61	0.2			
50000	169	17	0.0	252	24	0.0	461	41	0.1	768	65	0.1			
70000	169	17	0.0	264	25	0.0	474	42	0.0	806	68	0.1			
00000	181	18	0.0	276	26	0.0	499	44	0.0	845	71	0.0			
00000	192	19	0.0	288	27	0.0	537	47	0.0	909	76	0.0			

Single Sampling Tables for AQL = 10 % and γ = 2.

$100p_2$	30.0			25.0			20.0			17.0			15.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	12	2	25.3	12	2	39.1	12	2	55.8	12	2	66.6	12	2	73.6
50	18	3	16.5	28	4	13.5	28	4	31.5	28	4	47.1	28	4	58.7
70	25	4	9.0	35	5	9.8	47	6	14.4	47	6	29.2	47	6	43.0
100	32	5	5.1	41	6	8.3	51	7	17.3	62	8	25.2	75	9	29.5
200	45	7	2.1	53	8	6.1	81	11	9.2	100	13	17.7	133	16	20.3
300	44	7	2.6	68	10	2.9	104	14	5.6	132	17	12.4	173	21	17.2
500	58	9	0.9	74	11	2.5	126	17	3.9	181	23	7.1	240	29	11.8
700	58	9	0.9	82	12	1.7	141	19	2.9	205	26	5.6	290	35	9.1
1000	65	10	0.5	97	14	0.8	157	21	2.0	238	30	3.9	340	41	7.2
2000	72	11	0.3	112	16	0.4	189	25	1.0	304	38	1.9	461	55	3.5
3000	80	12	0.2	120	17	0.3	205	27	0.7	338	42	1.3	531	63	2.2
5000	87	13	0.1	128	18	0.2	230	30	0.4	381	47	0.7	609	72	1.4
7000	87	13	0.1	136	19	0.1	247	32	0.2	407	50	0.5	662	78	1.0
10000	95	14	0.0	144	20	0.1	255	33	0.2	442	54	0.3	716	84	0.7
20000	103	15	0.0	152	21	0.1	290	37	0.1	495	60	0.2	824	96	0.3
30000	103	15	0.0	161	22	0.0	298	38	0.1	521	63	0.1			
50000	111	16	0.0	169	23	0.0	324	41	0.0	557	67	0.1			
70000	111	16	0.0	177	24	0.0	333	42	0.0	584	70	0.0			
00000	119	17	0.0	186	25	0.0	351	44	0.0	611	73	0.0			
00000	127	18	0.0	194	26	0.0	368	46	0.0	657	78	0.0			

Single Sampling Tables for AQL = 0.1 % and γ = 10.

$100p_2$	1.0			0.6			0.4			0.3			0.2		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	25	0	77.8	25	0	86.0	25	0	90.5	25	0	92.8	25	0	95.1
50	32	0	72.5	32	0	82.5	32	0	88.0	32	0	90.8	32	0	93.8
70	37	0	68.9	37	0	80.0	37	0	86.2	37	0	89.5	37	0	92.9
100	40	0	66.9	40	0	78.6	40	0	85.2	40	0	88.7	40	0	92.3
200	45	0	63.6	45	0	76.3	45	0	83.5	45	0	87.4	45	0	91.4
300	47	0	62.4	47	0	75.4	47	0	82.8	47	0	86.8	47	0	91.0
500	49	0	61.1	49	0	74.5	49	0	82.2	49	0	86.3	49	0	90.7
700	49	0	61.1	49	0	74.5	49	0	82.2	49	0	86.3	49	0	90.7
1000	50	0	60.5	50	0	74.0	50	0	81.8	50	0	86.1	50	0	90.5
2000	448	1	6.1	448	1	25.0	448	1	46.5	448	1	61.1	448	1	77.4
3000	1106	2	0.1	1106	2	3.9	1106	2	18.2	1106	2	35.5	1106	2	61.9
5000	947	2	0.4	1714	3	0.8	2747	4	1.5	2747	4	8.6	2747	4	35.8
7000	902	2	0.6	1578	3	1.5	3356	5	0.8	4564	6	1.7	4564	6	19.5
10000	1501	3	0.0	2225	4	0.3	3935	6	0.5	4932	7	2.0	7413	9	7.5
20000	1428	3	0.0	2792	5	0.1	4343	7	0.4	6940	10	0.7	13128	16	2.2
30000	1406	3	0.0	2727	5	0.1	4991	8	0.2	7488	11	0.6	16050	20	1.5
50000	1390	3	0.0	2680	5	0.1	5638	9	0.1	8897	13	0.3	19773	25	0.9
70000	1383	3	0.1	3353	6	0.0	5574	9	0.1	9591	14	0.2	22023	28	0.7
00000	1378	3	0.1	3333	6	0.0	6294	10	0.1	10304	15	0.1	24317	31	0.5
00000	1981	4	0.0	3309	6	0.0	6231	10	0.1	10979	16	0.1	28219	36	0.2

Single Sampling Tables for AQL = 0.2 % and γ = 10.

$100p_2$	2.0			1.2			0.8			0.6			0.4		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	18	0	69.5	18	0	80.5	18	0	86.5	18	0	89.7	18	0	93.0
50	20	0	66.8	20	0	78.5	20	0	85.2	20	0	88.7	20	0	92.3
70	22	0	64.1	22	0	76.7	22	0	83.8	22	0	87.6	22	0	91.6
100	23	0	62.8	23	0	75.8	23	0	83.1	23	0	87.1	23	0	91.2
200	24	0	61.6	24	0	74.8	24	0	82.5	24	0	86.6	24	0	90.8
300	25	0	60.3	25	0	73.9	25	0	81.8	25	0	86.0	25	0	90.5
500	25	0	60.3	25	0	73.9	25	0	81.8	25	0	86.0	25	0	90.5
700	270	1	2.8	270	1	16.4	270	1	36.3	270	1	51.8	270	1	70.6
1000	224	1	6.0	224	1	24.9	224	1	46.4	224	1	61.1	224	1	77.4
2000	498	2	0.3	947	3	0.4	947	3	5.6	947	3	18.1	947	3	47.6
3000	460	2	0.5	815	3	1.2	1256	4	2.8	1822	5	3.9	1822	5	26.5
5000	751	3	0.0	1113	4	0.3	1968	6	0.5	2467	7	2.0	3707	9	7.5
7000	729	3	0.0	1070	4	0.4	1846	6	0.9	2734	8	1.7	4924	12	4.4
10000	714	3	0.0	1397	5	0.1	2172	7	0.4	3471	10	0.7	6565	16	2.2
20000	699	3	0.0	1349	5	0.1	2456	8	0.3	4085	12	0.4	8665	22	1.5
30000	694	3	0.0	1335	5	0.1	2801	9	0.1	4410	13	0.3	10198	26	0.9
50000	690	3	0.1	1667	6	0.0	3148	10	0.1	5153	15	0.1	12160	31	0.5
70000	993	4	0.0	1660	6	0.0	3130	10	0.1	5113	15	0.1	12900	33	0.4
00000	991	4	0.0	1655	6	0.0	3117	10	0.1	5491	16	0.1	14111	36	0.2
00000	989	4	0.0	1999	7	0.0	3482	11	0.0	6268	18	0.0	16161	41	0.1

Single Sampling Tables for AQL = 0.5 % and γ = 10.

$100p_2$	5.0			3.0			2.0			1.5			1.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	9	0	63.0	9	0	76.0	9	0	83.4	9	0	87.3	9	0	91.4
50	9	0	63.0	9	0	76.0	9	0	83.4	9	0	87.3	9	0	91.4
70	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
100	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
200	10	0	59.9	10	0	73.7	10	0	81.7	10	0	86.0	10	0	90.4
300	103	1	3.3	103	1	18.2	103	1	38.7	103	1	54.2	103	1	72.5
500	251	2	0.0	251	2	1.9	251	2	12.0	251	2	27.2	251	2	54.1
700	208	2	0.2	421	3	0.1	421	3	3.1	421	3	12.3	421	3	39.2
1000	190	2	0.4	343	3	0.8	550	4	1.4	550	4	8.5	550	4	35.6
2000	175	2	0.7	446	4	0.3	788	6	0.4	987	7	1.9	1483	9	7.5
3000	291	3	0.0	426	4	0.4	732	6	0.9	1269	9	0.8	2163	13	3.2
5000	284	3	0.0	551	5	0.1	853	7	0.5	1351	10	0.9	2904	18	1.9
7000	281	3	0.0	543	5	0.1	990	8	0.2	1651	12	0.3	3332	21	1.5
10000	279	3	0.0	537	5	0.1	1129	9	0.1	1781	13	0.2	3765	24	1.2
20000	276	3	0.0	668	6	0.0	1107	9	0.1	1898	14	0.2	4866	31	0.4
30000	398	4	0.0	664	6	0.0	1252	10	0.1	2044	15	0.1	5331	34	0.3
50000	397	4	0.0	662	6	0.0	1398	11	0.0	2355	17	0.0	5977	38	0.2
70000	396	4	0.0	801	7	0.0	1395	11	0.0	2348	17	0.0	6300	40	0.1
100000	396	4	0.0	800	7	0.0	1393	11	0.0	2505	18	0.0	6629	42	0.1
200000	395	4	0.0	799	7	0.0	1543	12	0.0	2661	19	0.0	7304	46	0.0

Single Sampling Tables for AQL = 1 % and γ = 10.

$100p_2$	6.0			4.0			3.0			2.5			2.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
50	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
70	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
100	5	0	73.4	5	0	81.5	5	0	85.9	5	0	88.1	5	0	90.4
200	45	1	23.9	45	1	45.8	45	1	60.7	45	1	68.9	45	1	77.3
300	111	2	3.4	111	2	17.5	111	2	34.9	111	2	47.3	111	2	61.7
500	172	3	0.7	276	4	1.3	276	4	8.1	276	4	17.9	276	4	35.2
700	159	3	1.2	337	5	0.7	457	6	1.6	457	6	6.0	457	6	19.2
1000	223	4	0.2	305	5	1.6	494	7	1.9	607	8	3.3	742	9	7.3
2000	209	4	0.4	436	7	0.4	696	10	0.6	886	12	1.3	1314	16	2.1
3000	274	5	0.1	501	8	0.2	750	11	0.5	1019	14	0.9	1607	20	1.4
5000	269	5	0.1	488	8	0.2	892	13	0.2	1238	17	0.4	1884	24	1.1
7000	267	5	0.1	559	9	0.1	878	13	0.3	1302	18	0.4	2112	27	0.8
10000	334	6	0.0	554	9	0.1	950	14	0.2	1455	20	0.2	2344	30	0.5
20000	332	6	0.0	625	10	0.0	1100	16	0.1	1601	22	0.1	2825	36	0.2
30000	331	6	0.0	699	11	0.0	1177	17	0.0	1761	24	0.1	3070	39	0.1
50000	401	7	0.0	697	11	0.0	1254	18	0.0	1838	25	0.0	3317	42	0.1
70000	400	7	0.0	773	12	0.0	1252	18	0.0	1919	26	0.0	3485	44	0.1
100000	400	7	0.0	773	12	0.0	1332	19	0.0	2001	27	0.0	3655	46	0.0
200000	400	7	0.0	850	13	0.0	1412	20	0.0	2167	29	0.0	3911	49	0.0

Single Sampling Tables for AQL = 2 % and γ = 10.

$100p_2$	12.0			8.0			6.0			5.0			4.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	2	0	77.4	2	0	84.6	2	0	88.4	2	0	90.2	2	0	92.2
50	2	0	77.4	2	0	84.6	2	0	88.4	2	0	90.2	2	0	92.2
70	27	1	14.8	27	1	35.2	27	1	51.2	27	1	60.6	27	1	70.6
100	23	1	21.9	23	1	44.1	23	1	59.5	23	1	67.9	23	1	76.6
200	95	3	0.2	95	3	4.9	95	3	17.1	95	3	29.5	95	3	47.0
300	82	3	0.8	126	4	2.3	183	5	3.4	183	5	10.1	183	5	25.6
500	112	4	0.2	153	5	1.4	248	7	1.7	304	8	3.1	372	9	7.0
700	108	4	0.3	186	6	0.6	275	8	1.4	376	10	1.8	494	12	4.0
1000	105	4	0.3	219	7	0.3	349	10	0.5	444	12	1.2	658	16	2.0
2000	136	5	0.1	247	8	0.2	410	12	0.3	541	15	0.7	869	22	1.3
3000	135	5	0.1	282	9	0.1	443	13	0.2	614	17	0.4	1023	26	0.8
5000	133	5	0.1	278	9	0.1	476	14	0.2	686	19	0.3	1173	30	0.5
7000	167	6	0.0	315	10	0.0	514	15	0.1	765	21	0.1	1293	33	0.3
10000	167	6	0.0	313	10	0.0	551	16	0.1	802	22	0.1	1370	35	0.2
20000	166	6	0.0	350	11	0.0	588	17	0.0	880	24	0.1	1576	40	0.1
30000	201	7	0.0	349	11	0.0	628	18	0.0	920	25	0.0	1658	42	0.1
50000	201	7	0.0	387	12	0.0	668	19	0.0	1002	27	0.0	1785	45	0.0
70000	201	7	0.0	387	12	0.0	667	19	0.0	1044	28	0.0	1871	47	0.0
100000	201	7	0.0	387	12	0.0	708	20	0.0	1085	29	0.0	1958	49	0.0
200000	201	7	0.0	426	13	0.0	748	21	0.0	1127	30	0.0	2089	52	0.0

Single Sampling Tables for AQL = 3 % and γ = 10.

$100p_2$	12.0			9.0			7.5			6.0			5.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	2	0	77.4	2	0	82.8	2	0	85.6	2	0	88.4	2	0	90.2
50	18	1	34.6	18	1	50.9	18	1	60.4	18	1	70.6	18	1	77.4
70	56	2	2.9	56	2	11.0	56	2	19.9	56	2	33.9	56	2	46.5
100	37	2	16.3	37	2	34.1	37	2	46.8	37	2	61.6	37	2	71.8
200	85	4	2.0	122	5	3.2	122	5	9.8	122	5	25.3	122	5	42.5
300	105	5	1.0	172	7	1.1	216	8	1.6	216	8	9.5	216	8	24.4
500	123	6	0.6	181	8	1.5	246	10	2.0	362	13	2.8	411	14	8.0
700	145	7	0.3	231	10	0.5	294	12	1.2	433	16	2.2	557	19	4.6
1000	142	7	0.4	251	11	0.4	341	14	0.7	503	19	1.8	722	25	3.0
2000	163	8	0.2	296	13	0.2	410	17	0.4	683	26	0.7	1042	37	1.5
3000	186	9	0.1	319	14	0.1	460	19	0.2	757	29	0.5	1230	44	1.0
5000	185	9	0.1	343	15	0.1	510	21	0.1	862	33	0.3	1447	52	0.6
7000	209	10	0.0	368	16	0.0	535	22	0.1	914	35	0.2	1585	57	0.5
10000	209	10	0.0	367	16	0.1	561	23	0.1	997	38	0.1	1725	62	0.3
20000	234	11	0.0	419	18	0.0	614	25	0.0	1107	42	0.1	1981	71	0.2
30000	233	11	0.0	419	18	0.0	641	26	0.0	1163	44	0.0	2127	76	0.1
50000	259	12	0.0	446	19	0.0	669	27	0.0	1249	47	0.0	2304	82	0.1
70000	259	12	0.0	473	20	0.0	696	28	0.0	1277	48	0.0	2392	85	0.0
100000	285	13	0.0	473	20	0.0	724	29	0.0	1336	50	0.0	2512	89	0.0
200000	285	13	0.0	500	21	0.0	781	31	0.0	1423	53	0.0	2693	95	0.0

Single Sampling Tables for AQL = 4 % and γ = 10.

$100p_2$	12.0			10.0			8.0			7.0			6.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	16	1	41.2	16	1	51.5	16	1	63.0	16	1	69.0	16	1	75.1
50	12	1	56.9	12	1	65.9	12	1	75.1	12	1	79.7	12	1	84.0
70	29	2	30.7	29	2	43.5	29	2	58.7	29	2	66.8	29	2	74.9
100	48	3	15.7	48	3	28.0	48	3	45.8	48	3	56.4	48	3	67.5
200	107	6	2.2	139	7	2.7	139	7	12.5	139	7	23.6	139	7	40.1
300	143	8	0.8	170	9	2.1	235	11	3.3	235	11	9.8	235	11	24.4
500	153	9	0.9	223	12	1.0	301	15	2.8	394	18	3.1	432	19	9.2
700	169	10	0.6	235	13	1.0	357	18	2.0	465	22	2.9	591	26	5.5
1000	185	11	0.5	272	15	0.6	436	22	1.1	562	27	2.1	757	34	4.3
2000	220	13	0.2	326	18	0.3	549	28	0.5	761	37	1.0	1161	53	2.0
3000	238	14	0.1	343	19	0.2	607	31	0.4	860	42	0.7	1392	64	1.3
5000	257	15	0.1	381	21	0.1	665	34	0.2	1006	49	0.3	1691	78	0.8
7000	276	16	0.0	401	22	0.1	727	37	0.1	1066	52	0.3	1862	86	0.6
10000	275	16	0.0	420	23	0.1	768	39	0.1	1151	56	0.2	2034	94	0.4
20000	315	18	0.0	461	25	0.0	852	43	0.0	1301	63	0.1			
30000	315	18	0.0	481	26	0.0	894	45	0.0	1366	66	0.1			
50000	335	19	0.0	523	28	0.0	937	47	0.0	1477	71	0.0			
70000	355	20	0.0	544	29	0.0	981	49	0.0	1521	73	0.0			
100000	355	20	0.0	544	29	0.0	1025	51	0.0	1588	76	0.0			
200000	376	21	0.0	587	31	0.0	1091	54	0.0	1700	81	0.0			

Single Sampling Tables for AQL = 5 % and γ = 10.

$100p_2$	15.0			12.5			10.0			8.5			7.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	11	1	49.2	11	1	59.2	11	1	69.7	11	1	76.1	11	1	80.3
50	26	2	23.0	26	2	35.2	26	2	51.1	26	2	61.8	26	2	69.1
70	43	3	9.6	43	3	19.8	43	3	36.5	43	3	49.7	43	3	59.5
100	56	4	6.3	56	4	15.5	56	4	32.9	56	4	47.7	56	4	58.8
200	100	7	1.2	122	8	2.5	149	9	6.3	149	9	17.7	149	9	31.3
300	109	8	1.2	148	10	1.8	218	13	2.5	247	14	6.3	247	14	16.6
500	137	10	0.5	191	13	0.8	271	17	2.1	361	21	3.6	445	24	5.0
700	150	11	0.3	202	14	0.8	315	20	1.5	440	26	2.7	557	31	4.5
1000	163	12	0.2	232	16	0.4	360	23	1.1	538	32	1.7	710	40	3.1
2000	176	13	0.2	276	19	0.2	453	29	0.5	696	42	0.9	1010	58	1.7
3000	190	14	0.1	290	20	0.1	500	32	0.3	795	48	0.6	1197	69	1.1
5000	205	15	0.1	322	22	0.1	548	35	0.2	911	55	0.3	1419	82	0.6
7000	221	16	0.0	337	23	0.1	598	38	0.1	979	59	0.2	1558	90	0.4
10000	237	17	0.0	353	24	0.0	631	40	0.1	1047	63	0.2	1698	98	0.3
20000	252	18	0.0	369	25	0.0	682	43	0.0	1168	70	0.1			
30000	252	18	0.0	386	26	0.0	716	45	0.0	1238	74	0.1			
50000	268	19	0.0	419	28	0.0	768	48	0.0	1328	79	0.0			
70000	285	20	0.0	436	29	0.0	785	49	0.0	1381	82	0.0			
100000	285	20	0.0	436	29	0.0	821	51	0.0	1436	85	0.0			
200000	301	21	0.0	470	31	0.0	874	54	0.0	1544	91	0.0			

Single Sampling Tables for AQL = 7 % and γ = 10.

$100p_2$	21.0			17.5			14.0			12.0			10.5		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	25	2	8.0	25	2	16.1	25	2	30.0	25	2	40.9	25	2	50.4
50	31	3	8.5	31	3	18.4	31	3	35.2	31	3	48.0	31	3	58.7
70	41	4	4.9	41	4	13.3	41	4	30.2	41	4	44.4	41	4	56.6
100	49	5	3.9	66	6	4.3	66	6	16.6	66	6	30.8	66	6	45.2
200	80	8	0.8	108	10	1.2	142	12	3.1	163	13	6.6	163	13	17.9
300	87	9	0.7	127	12	0.8	171	15	2.6	221	18	4.3	261	20	7.7
500	96	10	0.5	145	14	0.6	226	20	1.3	315	26	2.1	399	31	4.1
700	105	11	0.4	154	15	0.5	258	23	0.9	371	31	1.5	494	39	3.1
1000	116	12	0.2	176	17	0.3	291	26	0.6	427	36	1.1	601	48	2.3
2000	137	14	0.1	196	19	0.2	346	31	0.3	530	45	0.6	818	66	1.1
3000	136	14	0.1	207	20	0.1	368	33	0.2	589	50	0.4	953	77	0.7
5000	147	15	0.0	230	22	0.1	403	36	0.1	661	56	0.2	1101	89	0.4
7000	158	16	0.0	241	23	0.0	427	38	0.1	710	60	0.1	1188	96	0.3
10000	158	16	0.0	253	24	0.0	451	40	0.1	747	63	0.1			
20000	181	18	0.0	264	25	0.0	500	44	0.0	835	70	0.0			
30000	181	18	0.0	276	26	0.0	525	46	0.0	872	73	0.0			
50000	192	19	0.0	300	28	0.0	550	48	0.0	923	77	0.0			
70000	192	19	0.0	300	28	0.0	562	49	0.0	962	80	0.0			
100000	204	20	0.0	312	29	0.0	588	51	0.0	1001	83	0.0			
200000	216	21	0.0	337	31	0.0	626	54	0.0	1066	88	0.0			

Single Sampling Tables for AQL = 10 % and γ = 10.

$100p_2$	30.0			25.0			20.0			17.0			15.0		
N	n	c	100P	n	c	100P	n	c	100P	n	c	100P	n	c	100P
30	12	2	25.3	12	2	39.1	12	2	55.8	12	2	66.6	12	2	73.6
50	28	4	4.7	28	4	13.5	28	4	31.5	28	4	47.1	28	4	58.7
70	35	5	2.7	47	6	3.2	47	6	14.4	47	6	29.2	47	6	43.0
100	41	6	1.9	62	8	1.5	75	9	5.0	75	9	15.9	75	9	29.5
200	53	8	1.0	81	11	0.9	122	15	1.8	158	18	3.4	174	19	7.6
300	68	10	0.3	95	13	0.5	142	18	1.5	195	23	2.9	243	27	5.0
500	74	11	0.2	108	15	0.4	172	22	0.9	260	31	1.5	345	39	2.9
700	73	11	0.3	115	16	0.3	196	25	0.5	290	35	1.3	411	47	2.2
1000	81	12	0.1	122	17	0.2	210	27	0.4	331	40	0.8	487	56	1.5
2000	88	13	0.1	137	19	0.1	250	32	0.2	405	49	0.4	632	73	0.7
3000	96	14	0.0	145	20	0.1	266	34	0.1	447	54	0.2	719	83	0.4
5000	103	15	0.0	161	22	0.0	291	37	0.1	490	59	0.1	805	93	0.3
7000	103	15	0.0	161	22	0.0	300	38	0.1	524	63	0.1			
10000	111	16	0.0	169	23	0.0	317	40	0.0	551	66	0.1			
20000	119	17	0.0	186	25	0.0	342	43	0.0	604	72	0.0			
30000	119	17	0.0	194	26	0.0	360	45	0.0	630	75	0.0			
50000	127	18	0.0	203	27	0.0	377	47	0.0	666	79	0.0			
70000	136	19	0.0	211	28	0.0	395	49	0.0	694	82	0.0			
100000	136	19	0.0	211	28	0.0	404	50	0.0	721	85	0.0			
200000	144	20	0.0	228	30	0.0	431	53	0.0	766	90	0.0			

Single Sampling Tables with Producer's Risk of 5 %

$B(c,m) = 0.95$, $r = p_2/p_1$, $m = np_1$, $M = Np_1$, $\gamma = 2.$

c	r / m	1.50 M	1.60 M	1.80 M	2.00 M	2.25 M	2.50 M	2.75 M	3.0 M	3.5 M	4.0 M	5.0 M	6.5 M
0	0.0515	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355
1	0.3555	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.875	1.17
2	0.8175	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.52	1.83	2.49	4.19
3	1.366	1.97	1.97	1.97	1.97	1.97	1.97	2.07	2.41	3.04	3.77	6.18	17.3
4	1.970	2.61	2.61	2.61	2.61	2.61	2.95	3.51	4.05	5.31	7.22	16.3	90.7
5	2.613	3.29	3.29	3.29	3.29	3.61	4.48	5.31	6.23	8.93	14.1	48.6	575
6	3.285	3.98	3.98	3.98	3.98	5.14	6.31	7.60	9.27	15.1	28.8	162	4180
7	3.981	4.69	4.69	4.69	5.26	6.88	8.51	10.6	13.7	26.3	62.6	585	33600
8	4.695	5.43	5.43	5.43	6.85	8.86	11.2	14.6	20.2	47.3	144	2260	294000
9	5.425	6.17	[illegible]	6.40	8.58	11.2	14.6	20.3	30.4	88.6	346	9180	
10	6.159	6.92	6.92	7.97	10.5	13.8	19.0	28.3	46.6	172	864	39000	
11	6.924	7.69	7.69	9.64	12.6	17.0	24.6	39.8	72.9	342	2220	172000	
12	7.689	8.46	8.46	11.4	14.9	20.8	32.1	56.9	116	699	5880		
13	8.464	9.25	9.25	13.3	17.4	25.4	42.2	82.5	169	1460	15900		
14	9.246	10.0	10.4	15.3	20.3	31.1	55.9	121	314	3100	43800		
15	10.04	10.8	12.1	17.4	23.6	38.1	74.6	181	526	6670	123000		
16	10.83	11.6	13.8	19.7	27.3	46.7	100	272	895	14600			
17	11.63	12.4	15.5	22.1	31.5	57.7	137	416	1540	32300			
18	12.44	13.3	17.3	24.8	36.3	71.5	188	640	2670	72200			
19	13.25	14.9	19.2	27.6	41.9	89.1	260	994	4680				
20	14.07	16.6	21.2	30.8	48.4	112	362	1560	8280				
22	15.72	20.1	25.3	37.9	64.7	178	718	3900	26400				
24	17.38	23.8	29.8	46.4	87.3	290	1460	9970	86200				
26	19.06	27.7	34.7	56.7	119	480	3010	26000					
28	20.75	31.8	40.1	69.4	164	809	6330	69200					
30	22.44	36.1	46.0	85.1	228	1380	13500						
35	26.73	48.2	63.7	144	546	5530							
40	31.07	62.5	87.4	253	1380	23400							
45	35.44	79.7	120	457	3630								
50	39.85	101	165	852	9840								
60	48.75	160	325	3180									
70	57.73	257	673	12800									
80	66.79	424	1460	53800									
90	75.90	716	3290										
99	84.14	1180	7020										

c	r / m	10.0 M
0	0.0515	0.355
1	0.3555	2.26
2	0.8175	24.9
3	1.366	506
4	1.970	15300
5	2.613	616000

Single Sampling Tables with Producers Risk of 5 %

$B(c,m) = 0.95$, $r = p_2/p_1$, $m = np_1$, $M = Np_1$, $\gamma = 10.$

c	r / m	1.50 M	1.60 M	1.80 M	2.00 M	2.25 M	2.50 M	2.75 M	3.0 M	3.5 M	4.0 M	5.0 M
0	0.0515	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355
1	0.3555	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817	0.817
2	0.8175	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
3	1.366	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	2.06
4	1.970	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	4.60
5	2.613	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	4.44	11.6
6	3.285	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	4.99	7.95	34.7
7	3.981	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.87	7.80	15.3	120
8	4.695	5.43	5.43	5.43	5.43	5.43	5.43	5.43	6.78	12.6	32.1	455
9	5.425	6.17	6.17	6.17	6.17	6.17	6.17	7.08	9.43	21.5	73.1	1840
10	6.169	6.92	6.92	6.92	6.92	6.92	6.94	9.30	13.3	38.7	177	7810
11	6.924	7.69	7.69	7.69	7.69	7.69	8.71	12.2	19.2	73.3	450	34400
12	7.689	8.46	8.46	8.46	8.46	8.46	10.9	16.3	28.5	145	1180	157000
13	8.464	9.25	9.25	9.25	9.25	9.38	13.5	22.0	43.7	298	3190	
14	9.246	10.0	10.0	10.0	10.0	11.2	16.9	30.5	69.2	626	8780	
15	10.04	10.8	10.8	10.8	10.8	13.2	21.3	43.0	112	1340	24600	
16	10.83	11.6	11.6	11.6	11.6	15.6	27.1	62.0	187	2920	70100	
17	11.63	12.4	12.4	12.4	12.4	18.5	35.1	91.3	316	6460		
18	12.44	13.3	13.3	13.3	13.5	21.9	45.9	137	544	14400		
19	13.25	14.1	14.1	14.1	15.3	26.1	60.9	208	947	32600		
20	14.07	14.9	14.9	14.9	17.3	31.3	82.1	322	1670	74500		
22	15.72	16.5	16.5	16.5	21.9	45.9	155	791	5290			
24	17.38	18.2	18.2	18.2	27.9	69.6	304	2010	17300			
26	19.06	19.9	19.9	21.0	35.6	109	616	5220	57600			
28	20.75	21.6	21.6	25.0	46.0	176	1280	13900				
30	22.44	23.3	23.3	29.6	60.2	292	2710	37300				
35	26.73	27.6	27.6	45.0	127	1130	18800					
40	31.07	31.9	32.9	70.3	297	4700						
45	35.44	36.3	43.1	115	751	20600						
50	39.85	40.7	56.0	197	2000							
60	48.75	58.1	95.3	670	15600							
70	57.73	85.2	172	2590								
80	66.79	126	337	10800								
90	75.90	192	710	47100								
99	84.14	291	1460									

c	r / m	6.5 M	10.0 M
0	0.0515	0.355	0.355
1	0.3555	0.817	0.817
2	0.8175	1.37	5.61
3	1.366	4.44	102
4	1.970	19.6	3060
5	2.613	117	123000
6	3.285	839	
7	3.981	6730	
8	4.695	58800	

Tables of p_{10}, p_{50}, and p_{95}.

The three tables on pp. 63 - 68 are based on the binomial distribution

$$B(c,n,p) = \sum_{x=0}^{c} \binom{n}{x} p^x q^{n-x}$$

For c = 0, 1, ..., 99, and for 100p = 0.1, 1.0, 5.0, 10.0, 15.0, 20.0 the tables give respectively

a) the smallest integer, n, for which $B(c,n,p) \leqq 0.10$,

b) the integer, n, for which $B(c,n,p)$ is nearest to 0.50, and

c) the largest integer, n, for which $B(c,n,p) \geqq 0.95$.

For the combinations of c and n found in the tables the stated values of p are therefore equal to p_{10}, p_{50}, and p_{95}, respectively.

For any sampling plan (c,n), $c \leqq 99$ and n not in the table, p may be determined from the formula

$$p = p_o n(p_o)/n,$$

$n(p_o)$ being the nearest tabular value of n and p_o the corresponding p.

An approximation to the corresponding "hypergeometric value", p_h, may be found from

$$p_h = p_b - \frac{np_b - c}{2N}$$

p_b being the value obtained from the present tables.

Table of p_{10}. $B(c,n,p) \leqq 0.10$. $p = p_o n(p_o)/n$.

c	0.1	1.0	5.0	10.0	15.0	20.0
			100p			
0	2302	230	45	22	15	11
1	3889	388	77	38	25	18
2	5321	531	105	52	34	25
3	6679	667	132	65	43	32
4	7992	798	158	78	52	38
5	9273	926	184	91	60	45
6	10530	1051	209	104	68	51
7	11769	1175	234	116	77	57
8	12993	1297	258	128	85	63
9	14204	1418	282	140	93	69
10	15404	1538	306	152	100	75
11	16596	1658	330	164	108	81
12	17779	1776	353	175	116	86
13	18955	1893	377	187	124	92
14	20125	2010	400	199	132	98
15	21290	2127	423	210	139	104
16	22449	2242	446	222	147	109
17	23603	2358	469	233	154	115
18	24753	2473	492	245	162	121
19	25900	2587	515	256	170	126
20	27042	2701	538	267	177	132
21	28181	2815	561	279	185	138
22	29317	2929	583	290	192	143
23	30450	3042	606	301	200	149
24	31580	3155	628	312	207	154
25	32708	3268	651	324	215	160
26	33833	3380	673	335	222	166
27	34956	3492	696	346	229	171
28	36076	3604	718	357	237	177
29	37195	3716	740	368	244	182
30	38311	3828	763	379	252	188
31	39426	3939	785	390	259	193
32	40539	4050	807	402	266	199
33	41650	4162	829	413	274	204
34	42760	4272	851	424	281	210
35	43868	4383	873	435	288	215
36	44974	4494	896	446	296	221
37	46079	4604	918	457	303	226
38	47183	4715	940	468	310	232
39	48285	4825	962	479	318	237
40	49386	4935	984	490	325	243
41	50486	5045	1006	501	332	248
42	51584	5155	1027	511	339	253
43	52682	5264	1049	522	347	259
44	53778	5374	1071	533	354	264
45	54873	5483	1093	544	361	270
46	55968	5593	1115	555	368	275
47	57061	5702	1137	566	376	281
48	58153	5811	1159	577	383	286
49	59244	5920	1180	588	390	291

Table of p_{10}. $B(c,n,p) \leqq 0.10$. $p = p_o n(p_o)/n$.

c	100p 0.1	1.0	5.0	10.0	15.0	20.0
50	60335	6029	1202	599	397	297
51	61424	6138	1224	609	405	302
52	62513	6247	1246	620	412	308
53	63601	6356	1267	631	419	313
54	64688	6464	1289	642	426	318
55	65774	6573	1311	653	433	324
56	66859	6681	1332	664	441	329
57	67944	6790	1354	674	448	334
58	69028	6898	1376	685	455	340
59	70111	7007	1397	696	462	345
60	71194	7115	1419	707	469	351
61	72276	7223	1440	718	477	356
62	73357	7331	1462	728	484	361
63	74437	7439	1484	739	491	367
64	75517	7547	1505	750	498	372
65	76597	7655	1527	761	505	377
66	77675	7763	1548	771	512	383
67	78753	7870	1570	782	519	388
68	79831	7978	1591	793	527	393
69	80908	8086	1613	804	534	399
70	81984	8193	1634	814	541	404
71	83060	8301	1656	825	548	409
72	84136	8409	1677	836	555	415
73	85211	8516	1699	846	562	420
74	86285	8623	1720	857	569	425
75	87359	8731	1742	868	577	431
76	88432	8838	1763	879	584	436
77	89505	8945	1784	889	591	441
78	90577	9053	1806	900	598	447
79	91649	9160	1827	911	605	452
80	92721	9267	1849	921	612	457
81	93792	9374	1870	932	619	463
82	94863	9481	1891	943	626	468
83	95933	9588	1913	953	633	473
84	97003	9695	1934	964	640	479
85	98072	9802	1955	975	648	484
86	99141	9909	1977	985	655	489
87	100210	10015	1998	996	662	495
88	101278	10122	2019	1007	669	500
89	102346	10229	2041	1017	676	505
90	103413	10336	2062	1028	683	511
91	104480	10442	2083	1038	690	516
92	105547	10549	2105	1049	697	521
93	106613	10656	2126	1060	704	526
94	107679	10762	2147	1070	711	532
95	108745	10869	2169	1081	718	537
96	109810	10975	2190	1092	725	542
97	110875	11082	2211	1102	733	548
98	111940	11188	2232	1113	740	553
99	113004	11295	2254	1123	747	558

Table of p_{50}. $B(c,n,p) = 0.50$. $p = p_o n(p_o)/n$.

	100p					
c	0.1	1.0	5.0	10.0	15.0	20.0
0	693	69	14	7	4	3
1	1678	167	33	16	11	8
2	2674	267	53	26	17	13
3	3672	367	73	36	24	18
4	4671	467	93	46	31	23
5	5670	567	113	56	37	28
6	6669	667	133	66	44	33
7	7669	767	153	76	51	38
8	8669	867	173	86	57	43
9	9668	967	193	96	64	48
10	10668	1067	213	106	71	53
11	11668	1167	233	116	77	58
12	12668	1266	253	126	84	63
13	13668	1366	273	136	91	68
14	14668	1466	293	146	97	73
15	15668	1566	313	156	104	78
16	16668	1666	333	166	111	83
17	17667	1766	353	176	117	88
18	18667	1866	373	186	124	93
19	19667	1966	393	196	131	98
20	20667	2066	413	206	137	103
21	21667	2166	433	216	144	108
22	22667	2266	453	226	151	113
23	23667	2366	473	236	157	118
24	24667	2466	493	246	164	123
25	25667	2566	513	256	171	128
26	26667	2666	533	266	177	133
27	27667	2766	553	276	184	138
28	28667	2866	573	286	191	143
29	29667	2966	593	296	197	148
30	30667	3066	613	306	204	153
31	31667	3166	633	316	211	158
32	32667	3266	653	326	217	163
33	33667	3366	673	336	224	168
34	34667	3466	693	346	231	173
35	35667	3566	713	356	237	178
36	36667	3666	733	366	244	183
37	37667	3766	753	376	251	188
38	38667	3866	773	386	257	193
39	39667	3966	793	396	264	198
40	40667	4066	813	406	271	203
41	41667	4166	833	416	277	208
42	42667	4266	853	426	284	213
43	43667	4366	873	436	291	218
44	44667	4466	893	446	297	223
45	45667	4566	913	456	304	228
46	46667	4666	933	466	311	233
47	47667	4766	953	476	317	238
48	48667	4866	973	486	324	243
49	49667	4966	993	496	331	248

Table of p_{50}. $B(c,n,p) = 0.50$. $p = p_o n(p_o)/n$.

c	100p 0.1	1.0	5.0	10.0	15.0	20.0
50	50667	5066	1013	506	337	253
51	51667	5166	1033	516	344	258
52	52667	5266	1053	526	351	263
53	53667	5366	1073	536	357	268
54	54667	5466	1093	546	364	273
55	55667	5566	1113	556	371	278
56	56667	5666	1133	566	377	283
57	57667	5766	1153	576	384	288
58	58667	5866	1173	586	391	293
59	59667	5966	1193	596	397	298
60	60667	6066	1213	606	404	303
61	61667	6166	1233	616	411	308
62	62667	6266	1253	626	417	313
63	63667	6366	1273	636	424	318
64	64667	6466	1293	646	431	323
65	65667	6566	1313	656	437	328
66	66667	6666	1333	666	444	333
67	67667	6766	1353	676	451	338
68	68667	6866	1373	686	457	343
69	69667	6966	1393	696	464	348
70	70667	7066	1413	706	471	353
71	71667	7166	1433	716	477	358
72	72667	7266	1453	726	484	363
73	73667	7366	1473	736	491	368
74	74667	7466	1493	746	497	373
75	75667	7566	1513	756	504	378
76	76667	7666	1533	766	511	383
77	77667	7766	1553	776	517	388
78	78667	7866	1573	786	524	393
79	79667	7966	1593	796	531	398
80	80667	8066	1613	806	537	403
81	81667	8166	1633	816	544	408
82	82667	8266	1653	826	551	413
83	83667	8366	1673	836	557	418
84	84667	8466	1693	846	564	423
85	85667	8566	1713	856	571	428
86	86667	8666	1733	866	577	433
87	87667	8766	1753	876	584	438
88	88667	8866	1773	886	591	443
89	89667	8966	1793	896	597	448
90	90667	9066	1813	906	604	453
91	91667	9166	1833	916	611	458
92	92667	9266	1853	926	617	463
93	93667	9366	1873	936	624	468
94	94667	9466	1893	946	631	473
95	95667	9566	1913	956	637	478
96	96667	9666	1933	966	644	483
97	97667	9766	1953	976	651	488
98	98667	9866	1973	986	657	493
99	99667	9966	1993	996	664	498

Table of p_{95}. $B(c,n,p) \geqq 0.95$. $p = p_o n(p_o)/n$.

c	100p: 0.1	1.0	5.0	10.0	15.0	20.0
0	51	5	1	0	0	0
1	355	35	7	3	2	2
2	818	82	16	8	6	4
3	1367	137	28	14	10	7
4	1971	198	40	20	14	10
5	2614	262	53	27	18	14
6	3286	329	67	34	23	17
7	3982	399	81	41	28	21
8	4696	471	95	48	33	25
9	5427	544	110	56	38	29
10	6170	618	125	63	43	32
11	6926	694	140	71	48	36
12	7691	771	155	79	53	40
13	8466	848	171	86	58	44
14	9248	927	187	94	64	48
15	10038	1006	203	102	69	52
16	10834	1085	219	110	74	56
17	11637	1166	235	119	80	61
18	12444	1246	251	127	85	65
19	13257	1328	268	135	91	69
20	14075	1410	284	143	96	73
21	14896	1492	300	152	102	77
22	15722	1575	317	160	108	81
23	16552	1658	334	168	113	86
24	17385	1741	351	177	119	90
25	18221	1825	367	185	125	94
26	19061	1909	384	194	130	99
27	19904	1993	401	202	136	103
28	20749	2078	418	211	142	107
29	21597	2163	435	219	147	111
30	22448	2248	452	228	153	116
31	23301	2333	469	236	159	120
32	24156	2419	487	245	165	124
33	25014	2505	504	254	170	129
34	25873	2591	521	262	176	133
35	26735	2677	538	271	182	138
36	27598	2763	556	280	188	142
37	28464	2850	573	289	194	146
38	29331	2937	590	297	200	151
39	30200	3023	608	306	205	155
40	31070	3111	625	315	211	160
41	31942	3198	643	324	217	164
42	32816	3285	660	332	223	168
43	33691	3373	678	341	229	173
44	34567	3461	696	350	235	177
45	35445	3548	713	359	241	182
46	36324	3636	731	368	247	186
47	37205	3724	748	377	253	191
48	38086	3813	766	385	259	195
49	38969	3901	784	394	265	200

Table of p_{95}. $B(c,n,p) \geqq 0.95$. $p = p_o n(p_o)/n$.

c	100p 0.1	1.0	5.0	10.0	15.0	20.0
50	39853	3989	802	403	270	204
51	40739	4078	819	412	276	209
52	41625	4167	837	421	282	213
53	42512	4256	855	430	288	218
54	43401	4344	873	439	294	222
55	44290	4433	891	448	300	227
56	45181	4522	909	457	306	231
57	46072	4612	926	466	312	236
58	46964	4701	944	475	318	240
59	47857	4790	962	484	324	245
60	48752	4880	980	493	330	249
61	49647	4969	998	502	336	254
62	50542	5059	1016	511	342	258
63	51439	5149	1034	520	348	263
64	52337	5238	1052	529	354	267
65	53235	5328	1070	538	361	272
66	54134	5418	1088	547	367	276
67	55034	5508	1106	556	373	281
68	55934	5598	1124	565	379	286
69	56835	5689	1142	574	385	290
70	57737	5779	1160	583	391	295
71	58640	5869	1178	592	397	299
72	59543	5959	1197	601	403	304
73	60447	6050	1215	610	409	308
74	61352	6140	1233	619	415	313
75	62257	6231	1251	629	421	318
76	63163	6322	1269	638	427	322
77	64069	6412	1287	647	433	327
78	64976	6503	1306	656	439	331
79	65884	6594	1324	665	446	336
80	66792	6685	1342	674	452	340
81	67701	6776	1360	683	458	345
82	68611	6867	1378	692	464	350
83	69521	6958	1397	702	470	354
84	70431	7049	1415	711	476	359
85	71342	7140	1433	720	482	363
86	72253	7231	1451	729	488	368
87	73165	7322	1470	738	494	373
88	74078	7414	1488	747	501	377
89	74991	7505	1506	757	507	382
90	75904	7596	1525	766	513	386
91	76818	7688	1543	775	519	391
92	77733	7779	1561	784	525	396
93	78648	7871	1580	793	531	400
94	79563	7962	1598	802	537	405
95	80479	8054	1616	812	544	410
96	81395	8146	1635	821	550	414
97	82312	8237	1653	830	556	419
98	83229	8329	1671	839	562	423
99	84146	8421	1690	849	568	428